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FIFTY-FIRST
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of the Naval Service

FOR THE YEAR

1917

PRINTED BY ORDER OF PARLIAMENT.



OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1918

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O.,
etc., etc., Governor General and Commander in Chief of the Dominion of
Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-first annual report of the Fisheries Branch of the Department of the Naval Service.

I have the honour to be,

Your Excellency's most obedient servant, -

C. C. BALLANTYNE,
Minister of the Naval Service.

DEPARTMENT OF THE NAVAL SERVICE,

OTTAWA, September, 1918.

ERRATA.

Page 26, last paragraph, should read:—"There were 95,122 persons engaged in the various branches of the fishing industry afloat and ashore during 1917, Of the total, 84,011 were engaged in the sea fisheries, 11,111 in the inland fisheries. There were 8,946 on vessels, tugs, and smacks; 62,700 in boats; 744 fishing without boats; and 22,732 working in canneries, freezers, smokehouses, etc., cleaning and preparing the fish for market."

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DEPUTY MINISTER'S REPORT.

To the Honourable C. C. BALLANTYNE,
Minister of the Naval Service.

SIR,—I have the honour to submit the fifty-first annual report of the Fisheries Branch of the Department of the Naval Service, which deals with (a) international questions and the investigation of the British Columbia salmon fisheries by special commission; (b) the various activities of the Branch; and (c) the production and value of the fisheries.

INTERNATIONAL QUESTIONS.

GENERAL.

For some years past, negotiations have been in progress with the United States for the settlement of certain outstanding fishery questions.

Ever since the American Revolution, the question of port, inshore, and onshore privileges to United States fishing vessels in Canadian waters and territory, has been a contentious subject, and at times it threatened the peaceful relations of the two countries.

This question was last dealt with in a permanent way, by the Treaty of October 20, 1818, one hundred years ago. It soon afterwards developed that the two countries placed different interpretations upon the meaning of certain of its terms, and the question of the true meaning of such terms was not settled until 1910, when it formed the subject of an arbitration at the Hague. There had always been a disposition to exchange an extension of the privileges to United States fishing vessels in our waters for free access for Canadian fish to the United States markets. Provisions of this character were included in the Reciprocity Treaty of 1854 and in the Treaty of Washington of 1871.

In view of this, the United States Government, in 1914, following the removal of the duty on fresh and unmanufactured fish going into that country, requested an extension of the privileges to their fishing vessels in Canadian waters.

On the other hand, Canadian fishing vessels were not being allowed to go to United States ports with their catches direct from the fishing grounds, and if they found themselves there for any reason they were not given clearances back to the fishing grounds, but had to clear for a port in an outside country. Hence the removal of the duty was being largely nullified to them.

Also, with a view to properly protecting her lobster fishery, Canada maintains a close season for fishing lobsters, during which Canadian fishermen are not permitted to fish either inside or outside Canadian territorial waters. But during the closed time along the southwestern coast of Nova Scotia, United States well-smacks have for years past been coming over and fishing outside territorial waters, and using our harbours at nights for shelter. This practice, Canada felt was a violation of the spirit and intention of the Treaty of 1818, and the fishing was not only causing great unrest amongst our local fishermen, but was in a large measure nullifying the good effects of our close season.

Negotiations had been proceeding during the past two years for a settlement of these matters, but with no definite result.

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Meantime a difficult and rather critical condition was developing on the Pacific coast. Since 1897 Canada has been granting special privileges to United States fishing vessels coming to British Columbia ports with their catches, by which they were enabled to ship their fish in bond to the United States. Following the completion of the Grand Trunk Pacific, these privileges were extended so as to allow vessels to sell their catches in bond to some duly authorized person or firm, who would in turn ship them in bond to the United States, thus enabling small vessels that did not land carload quantities, or that had not selling facilities in the Eastern States to avail themselves of the Canadian ports. As Prince Rupert is much nearer the fishing grounds than Seattle, most of the vessels from that port began to resort to the former to dispose of their catches. This caused great unrest and agitation in Seattle and in Ketchikan, Alaska, and last year a Bill was introduced into Congress which had for its object the preventing of any Pacific-caught fish being shipped into the United States through Canada, unless the consignments of such originated in a United States port. Representations were made by Canada against the adoption of this Bill and, while it passed through the initial stages, it was finally defeated, but notice was given that it would be again introduced at the following session of Congress. After protracted negotiations, Canada finally offered to settle the whole matter on both coasts on the following basis:—

1. That the *modus vivendi* be extended to all fishing vessels, by whatever means they may be propelled, that it be applied to the Pacific Coast as well as to the Atlantic, and that the annual fee be reduced from one dollar and fifty cents per registered ton to the nominal sum of one dollar per vessel. Also, that the renewal of the licenses from year to year be not conditional on an Order in Council, but form part of the arrangement itself.
2. That United States fishing vessels on both coasts be allowed to sell their fish in Canadian ports for the Canadian markets, subject to Customs duty, as well as to sell in bond.
3. That Canadian fishing vessels be allowed to purchase bait in United States ports or waters, on equal terms with American fishing vessels.
4. That Canadian fishing vessels be allowed to take their catches to United States ports and sell them there, subject to Customs duties, if any.
5. That fishing vessels of either country visiting ports in the other, be given clearances for the fishing grounds, if so desired.
6. That the United States prevent American lobster well-smacks from fishing off the Canadian coasts during the close seasons for lobster fishing on such coasts.
7. That such arrangement be in force until the expiration of two years after either party thereto shall give notice to the other of its wish to terminate the same.

Following receipt of these proposals the United States asked for the appointment of a Joint Commission to fully consider the whole matter. This was agreed to, and a commission consisting on the United States side of Hon. W. C. Redfield, Secretary of Commerce, Hon. E. F. Sweet, Assistant Secretary of Commerce, and Dr. H. M. Smith, Commissioner of Fisheries; and, on the Canadian side, of Hon. J. D. Hazen, Chief Justice for New Brunswick, (but who was Minister of this department while the negotiations were going on), W. A. Found, Superintendent of Fisheries, and the undersigned. Two other highly important questions—the rehabilitation and production of the sockeye fishery of the Fraser river system, and the protection of the halibut fishery of the Pacific coast—which were under consideration between the two Governments, were also referred to the commission. As the conditions of these two fisheries and the causes of the decline therein have been dealt with in recent annual reports, it is unnecessary to go into details of them herein.

The commission met at Washington on the 16th of January, and continued in session there until the 24th of that month. While substantial progress was made at these sittings, it was found to be desirable to hold some public sittings on both the Atlantic and Pacific coasts before reaching decisions. Such sittings were held in Boston and Gloucester, Mass., and St. John, N.B., from January 31, to February 6, both days inclusive. The commission then adjourned to meet

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at Seattle, Wash., on April 24, next. Following the return to Washington and Ottawa, respectively, of the two sections of the commission, they took up with their Governments the question of a temporary arrangement during the war to meet the difficulties in connection with privileges to the fishing vessels of either country in the ports of the other, with the object of removing every barrier to the greatest production of food and the freest movement thereof. On the 21st February the United States Secretary of Commerce, with the authority of the President, sent the following notice to the United States Collectors of Customs:—

To promote the vigorous prosecution of the war and to make the utmost use jointly of all the resources of the nations now co-operating you will permit, during the war, Canadian fishing vessels and those of other nations now acting with the United States to enter from and clear for the high seas and the fisheries, disposing of their catch and taking on supplies, stores, etc., under supervision as in the case of merchant vessels entering and clearing for foreign ports, except as to tonnage tax and other charges specifically imposed on entry from and clearance for foreign ports.

On the 8th March an Order in Council in the following terms was approved:—

The Minister of the Naval Service recommends, under the authority of the War Measures Act, chapter 2 of the Statutes of 1914, that during the war, United States fishing vessels, in addition to their treaty rights and privileges, shall be permitted to enter any port in Canada, without the requirement of a license, or the payment of fees not charged to Canadian fishing vessels, for any of the following purposes:

(a) The purchase of bait, ice, nets, lines, coal, oil, provisions and all other supplies and outfits used by fishing vessels whether the same are of a like character to those named in this section or not;

(b) Repairing fishing implements;

(c) Dressing and salting their catches on board ship;

(d) The shipping of crews;

(e) The transshipment of their catches;

(f) The sale thereof locally on payment of the duty.

The Minister further recommends that the fees paid on licenses already taken out for the present calendar year be remitted.

Thus for the term of the war this troublesome question has been fully and satisfactorily settled.

Also during the time that the commission was in Washington, the Secretary of Commerce gave instructions to have a Bill prepared for immediate introduction into Congress to prevent the continuance of United States lobster well-smacks coming over to the Canadian coast and fishing lobsters outside territorial waters during the Canadian close season there.

It is anticipated that the commission will complete its investigations and submit its report during the coming summer.

FUR-SEAL FISHERY.

Under the Pelagic Sealing Treaty of 1911, between Great Britain, the United States, Japan, and Russia, pelagic sealing, or the killing of fur seals at sea, is prohibited—excepting to the extent that such may be done by the Indians or other aborigines along the coast, using canoes—for a term of at least fifteen years, and during this period Canada is to receive 15 per cent gross in number and quality of the seal skins taken on the United States and Russian seal islands, and 10 per cent of those taken on the Japanese islands.

As the herds were so very seriously depleted when the treaty became effective, the year following, both the United States and Russia stopped all commercial killing on their islands for five years, so that commercial killing will begin in both countries in 1918.

In early years, before pelagic sealing became important, the United States islands readily yielded one hundred thousand fur seal-skins annually without

showing any ill effects on the herds, but in 1911, when the treaty came into effect, the total number of seals resorting to these islands was estimated at 123,600.

The increase during the past five years has been very satisfactory. A careful census taken in 1917 showed the presence of 468,692 seals on the islands.

As seals are born in about equal numbers as regards sex, and as they are highly polygamous, a large percentage of the young male seals may be killed each year, not only without detriment, but with absolute advantage to the seals. It is probable that from 20,000 to 30,000 such seals will be killed on these islands during the coming summer.

It has not been possible to procure much information regarding the conditions on the Russian Islands, but the total number of seals on these islands in 1917 was given as 15,000, and it was proposed to kill 750 during the summer of 1918.

The Japanese rookeries are quite small. They are now practically restricted to those on Robben island, which was ceded to Japan by Russia at the close of the Russo-Japanese war. Small killings went on, on these rookeries since 1911, with the exception of 1916 and 1917. Canada's share for the years 1912, 1913, and 1914, amounted in the aggregate to 123 skins. These were recently sent by Japan with her own share to St. Louis, U.S.A., to be sold at the fur sales there in April, 1918. Canada's share of the skins taken in 1915 amounted to 58. These were forwarded to Messrs. C. M. Lampson and Company, of London, during the present year, and will be sold in the April, 1919, sales.

While the number of seals reaching the island in 1916 and 1917 during the killing season was small, the census taken in the latter year showed that during the three months beginning with the 1st of August, 10,515 seals resorted to the islands. This is an eminently good showing, and is clear evidence that the rookeries will be in excellent condition in a few years.

Unless unforeseen conditions prevail, Canada will, beginning with 1918, receive an important revenue from its interest in the seal herds, the amount of which will rapidly grow from year to year as the sizes of the different herds increase.

SPECIAL COMMISSION TO INVESTIGATE THE SALMON FISHERIES OF DISTRICT NO. 2, BRITISH COLUMBIA.

The administration of the salmon fisheries of British Columbia, so as to enable the industry to be carried on to the greatest public advantage, and at the same time to afford the different species of salmon the protection necessary to maintain the runs thereof at a maximum of productivity, involves some of the most difficult and perplexing problems with which the department has to deal. Also, until the Privy Council decision in the Fisheries reference, in 1913, the question of right as between the Province and the Dominion was not fully defined, and dual jurisdiction prevailed, which added to the difficulties of the situation.

For several years the number of salmon canneries in district No. 2—that portion of the province north of Cape Caution—was restricted to a given number. The number of fishing licenses in the different areas was also, and still is, limited to that which investigations have shown the fisheries could safely stand, and these licenses were definitely allotted to the different canneries.

Some years ago it was decided that a departure from this policy was desirable, and accordingly licenses for some additional canneries were granted, and a number of the fishing licenses in each area were issued to *bona fide* white fishermen as unattached or independent of any cannery.

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After much consideration it was decided in 1917 that the time had arrived when all the fishing licenses should be issued independently of the canneries, and that restriction of the number of canneries to be allowed should be removed. Accordingly those engaging in the industry were notified that this would be done beginning with the season of 1917.

Following announcement of this decision, nearly all the canners interested interposed the most strenuous objection. They maintained that if this course were followed it would jeopardize the future of the industry, and in a few years it would be in a state of bankruptcy and chaos, when the position of the fishermen themselves would be much worse than at the present time. They expressed confidence that while the proposed policy might seem proper in theory, if the real state of the business end of the industry were fully understood, the department would not advise such a course, and they asked for a thorough investigation by a commission consisting of absolutely disinterested business men. It was decided to grant this request, and a commission consisting of Mr. W. Sanford Evans, as chairman, Mr. H. B. Thompson, now chairman of the Canada Food Board, and Mr. F. T. James, of the F. T. James Company, Limited, Toronto, was appointed.

The commission was asked to investigate and submit findings on the following points:—

1. Whether the number of salmon canneries allowed to be operated in District No. 2, British Columbia, should be restricted to the number of licenses for such establishments as are now effective, and if so, for what length of time.

2. Whether motor boats should be allowed to be used in salmon fishing operations in the said district.

3. Whether the number of fishing boats now allowed to be used in any area should be enlarged or reduced: (a) if motor boats are allowed, and (b) if row boats only are permitted, and if so, by how many in either case and in either direction.

4. Whether any of the boats authorized to be used in any area should be licensed to fish in connection with specified canneries only, and if so, what proportion of such boats.

5. Whether the export in a fresh condition of other varieties of salmon than sockeye should be prohibited, and if so, to what extent.

6. The actual amount of money in cash originally and at present invested in each cannery and equipment; the annual business done and the expenses connected therewith and the gross and net annual profits or losses sustained by each cannery in the said district since the boat-rating became effective, such information to be obtained by the examination of witnesses under oath, or by an audit of the books, or both, as may be found most desirable by the commissioners.

7. Such other points directly connected with the salmon fishing and canning industries in this district as in the opinion of the commissioners will better enable them to reach proper conclusions on the aforesaid subjects.

They investigated the matter very thoroughly during the past summer, and visited every area in which fishing was carried on.

As the commission submitted its report to you a few days before the end of the fiscal year, and as it is being printed for public use, it is unnecessary to comment on it herein.

CHANGE IN STATISTICAL YEAR.

Heretofore the twelve months period covered by the annual report on the fisheries was that of the fiscal year, extending from 1st of April to 31st of March following. But as the great bulk of the annual catch is landed during the spring, summer, and fall months—operations during January, February, and March being on a more limited scale—it was decided, since the last report was published, that the year for statistical purposes should, in future, be the calendar year. Consequently, the twelve months now being reported on are those from January to December, 1917.

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The figures for the first three months of the year were, of course, included in the last report and are repeated in this one in order that a full calendar year may be covered at the beginning for future comparative purposes.

CHANGE IN METHOD OF PUBLISHING REPORT.

There has also to be noted a change in the method of publishing the annual report. Under an arrangement for statistical co-operation between this department and the Dominion Bureau of Statistics, the latter will publish as a joint report the usual details of production by counties and districts, as Part III of its Census of Industry, under the title "Fisheries Statistics of Canada." The statistical information, however, is collected by our fishery officers and checked in this department, as before. It is then handed over to the Bureau of Statistics for publication. This report, therefore, contains a summary only of the production and value of the fisheries for the period named.

DEPARTMENTAL ACTIVITIES.

CONTROLLING AND PROTECTING THE FISHERIES.

To afford adequate protection to the fisheries that require such is, unfortunately, still a difficult and expensive matter. The vast extent of our country, its comparatively sparse population, the great number of rivers and streams up which anadromous sea fish ascend to spawn, many of these being in practically uninhabited portions of the country, the high prices and ready demand for the different species of fish and shell-fish most needing protection, all add to the difficulty of fully enforcing provident and necessary regulations. As the department's outside organization becomes more efficient and stronger, and as public sentiment against infractions of the fishery laws grows more emphatic, it is hoped that the department's work in this respect will become lighter.

No one is permitted to engage in most of the fisheries that will admit of only limited prosecution, unless he first procures from the department a fishery license. Up to the present the fisheries have not been regarded as an industry from which much direct revenue should be procured, hence the license fees are usually nominal as compared with the value of the concessions. During the present year a total number of 26,565 licenses were issued.

To see to the enforcement of the license provisions and the other laws and regulations designed to afford the various fisheries necessary protection, the fisheries branch has an outside organization consisting of chief inspectors, inspectors, overseers, and guardians, as well as a fleet of patrol boats to supervise waters that cannot be efficiently controlled from the land alone.

The first three named classes of officers are permanently employed, but the guardians are engaged only during such times as the overseers need special assistance. During the present year the numbers of officers and patrol boats in the different provinces were as follows:—

Province.	Chief Inspectors	Inspectors.	Overseers.	Guardians.	Patrol Boats.
British Columbia.....	1	3	20	30	20
Alberta and Saskatchewan.....	1	2	8	52	
Manitoba.....	..	2	3	18	1
Quebec.....	..	1	12	1	2
New Brunswick.....	..	3	29	167	6
Nova Scotia.....	..	3	59	457	7
Prince Edward Island.....	..	1	4	87	3
Yukon.....	..	1

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The organization in the eastern provinces is, in most portions thereof, inefficient. The number of officers is unduly large, but they are paid mere pittance, so that it is unreasonable to expect that they can devote to their fishery duties the time necessary for their proper performance. It is essential that a complete reorganization of this portion of the service should be effected without avoidable delay.

But while this class of work is of the utmost importance, and is very exacting on time, the affirmative side—the doing of things to increase the knowledge of the fishermen in the life-history of fish, to enable them to catch more fish, to prevent them losing valuable time unnecessarily, to encourage the better handling of fish so that fishermen will get more for their catches and consumers will receive a better article of food, to provide better facilities and cheap transportation rates for fish, to bring to the attention of the general public the value and comparative cheapness of fish as food, the keeping up and increasing the supplies of certain kinds of fish by artificial hatching and rearing, etc.,—has during this year received a full share of attention.

TRANSPORTATION OF FRESH FISH.

The assistance in affording better transportation facilities and cheaper rates for fish, that has been in operation for a number of years past, has been continued with some modification during this year. This work was started in 1907, and has proved one of the most helpful of the department's activities. Indeed such success has been met with, that the object in view—placing the fish business in a position where it can take care of itself—has been almost accomplished, so that the time is drawing near when it will be unnecessary for the department to bear any portion of the transportation charges on fish, but it will be always its duty and pleasure to aid in every feasible way in securing more adequate transportation facilities. Important as cheap rates are, proper facilities are even more important.

When this service was first undertaken, the shipments of fresh, mildly cured, and fresh frozen fish from the Atlantic coast, were so small that the railways did not find it feasible to place refrigerator cars, even to be hauled by freight, at the disposal of the dealers. There were no refrigerator express cars for fish, and the rates by the ordinary express cars were so high as, under the conditions then obtaining, to preclude the possibility of rapidly expanding the demand in the larger centres of consumption. Moreover, meat was then plentiful and cheap in all parts of the country, and as meat is less perishable and easier to handle than fish, it was extremely difficult to compete against it. Another great obstacle in Canada that does not obtain even in the United States is that, at least on the Atlantic coast, we have no large cities, and even on the Pacific coast there is but one. Montreal, the nearest one to the Atlantic, is nearly one thousand miles from the main shipping points in Nova Scotia.

In 1907 the department arranged for a limited refrigerator fast-freight service from Halifax and Mulgrave to Montreal, and the following year it undertook responsibility for the payment of one-third of the express charges on L.C.L. shipments from the Atlantic coast to points in Quebec and Ontario, and with a view to working up a demand in the Prairie provinces, a similar payment was authorized on shipments from the Pacific coast to such provinces.

Good effects immediately became manifest, and it affords the department the keenest pleasure to testify to the energy of the wholesale dealers and the larger producers, and to the cordial manner in which they co-operated with it and with each other to bring about the best results. Also the Canadian Government Railway and Express Companies, though unable to afford lower rates, have been doing everything they found to be feasible to encourage the business.

Experience shows that the needs of the business would be best served by a frequent express service by refrigerator cars, and year by year efforts were made to bring this about. Experiments in a limited express refrigerator service were made on different occasions, but sufficient cars of proper construction have not been available to the express companies. Moreover, the railways have not found it practicable to load their passenger trains, on which the express cars are hauled, to a greater extent than they have been doing. When the time comes that the mails and express packages will be of sufficient volume to require handling by separate trains, the difficulty of express refrigerator car shipments will, no doubt, be largely overcome. Meantime, the extension of the refrigerator fast-freight service, to be operated on schedule time, so far at least as the Atlantic coast is concerned, seems to offer the best solution of the problem for through shipments. Fish forwarded by such service reach their destination in better condition than consignments shipped in ordinary express cars. Hence, arrangements have been made with the railway to have a refrigerator fast-freight service made available to the shippers from the Atlantic coast three days each week, and the department looks forward to the time when this will be a daily service, operated on schedule time, so that it will be to all intents and purposes an express service at freight rates. It also hopes that it will be found feasible to extend this service at least to Toronto.

The growth of the business from the time the department first arranged for improved transportation facilities has been rapid, and, with the exception of the first two years of the war, continuous. The progress, that was made in the earlier years of such assistance in the different branches of the industry, made it possible for the producers and dealers to take advantage, to a much greater extent than would otherwise have been possible, of the opportunities that have more recently been arising on all sides.

The Canada Food Board, which was appointed this year, has done its full part in developing the demand for fish. It was not slow to recognize the place that fish could and should occupy in the food of our people, and its powers in controlling the use of different foods place it in a position to do the eminently excellent work it is doing, in making the use of fish much more general. There has been the closest co-operation between the board and this department.

Also the Canadian Fisheries Association has done excellent work in organizing the industry to the extent it has, thus bringing about closer co-operation amongst the different branches thereof. The department trusts that a realization of the benefits of such organization will speedily become general throughout Canada, on the part of the fishermen themselves as well as on that of the larger producers and of the wholesale and retail dealers, so that the association will be able to speak with full authority for all parts of the industry.

On the Pacific coast the industry has been so far largely confined to the salmon, halibut, and herring fisheries, notwithstanding that this coast is rich in other fisheries, and that vast quantities of other excellent edible fish are caught in fishing for halibut, but have been mostly thrown away as caught, on account of the lack of markets for them. The demand for halibut and salmon, both in Canada and the United States, has grown so rapidly in recent years that it is now greater than the supply, so that there is no longer need for the payment of any portion of the transportation charges on these fish.

On the other hand, it is pre-eminently desirable, both from the standpoint of the industry and of the public, that the various species of excellent flounders and so-called "cods" and other fish which can be produced cheaply and abundantly on the Pacific coast, should come into general use. To introduce these fish it is essential that they should be sold to the consumer at low prices. To this end it was decided during the past fall to change the method of assistance in shipments from the Pacific coast by discontinuing the payment of any portion

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of the express charges on halibut and salmon, and to replace such by the payment of two-thirds of the transportation charges on shipments of other fish, whether forwarded by express or freight, or in carload or less than carload lots. With this assistance, and under arrangements made by the Canada Food Board, it became possible to place flounders, cod, etc., on most of the markets of the Prairie Provinces at a retail price of 10 cents per pound. The result has been highly gratifying. Already important shipments are being made from week to week, and it is evident that the time is not far distant when the demand for these fish will be large enough to maintain an important fishing industry for them as such, instead of as a by-product of the halibut fishery. Indeed, already one company has found it feasible to start a steam otter trawler in fishing for flounders, etc.

While it has not been found practicable so far to procure a record of the total weights of the different varieties of fish supplied to the interior markets, the following statement showing the amounts paid by this department as its one-third of the charges on L.C.L. shipments by express, indicates in a measure the growth of the business:—

Year.	From East Coast.	From West Coast.
1909-10.....	\$15,162 20	\$13,541 76
1910-11.....	16,898 13	21,896 73
1911-12.....	19,620 62	35,315 10
1912-13.....	29,969 48	39,277 13
1913-14.....	37,818 85	44,114 47
1914-15.....	26,667 33	34,528 60
1915-16.....	27,122 69	34,872 56
1916-17.....	32,717 73	36,799 80
1917-18.....	49,550 89	46,371 84

As above indicated, this shows only a limited portion of the trade and its growth. By the refrigerator fast-freight service from the Atlantic coast, several carloads are shipped weekly. Also from the Pacific coast a number of carload lots are shipped weekly by express to supply the needs of Toronto, Montreal, and Winnipeg, on which no portion of the transportation charges are paid by this department. In addition to these, throughout the winter large shipments of frozen fish are forwarded from both coasts by ordinary freight.

On the whole, the expansion of the use of fresh, fresh frozen, and mildly cured fish in this country must be regarded as satisfactory, but the expansion that has taken place this year is merely an indication of the possibilities from now on. This country is particularly fortunate to have, at a time like this, fisheries that are second to none in their extent, variety, and abundance. The supply of meat, even before the war, had fallen below the demand. The shortage is now vastly greater apart from the fact that it is imperative that we shall not only export sufficient to meet the requirements of our soldiers overseas, but that we shall do our full part in supplying the needs of the Motherland and our European allies. There seems little room for hope that the meat shortage will be any less when the war ends. Indeed, it is not improbable that the most critical period in the world's food supply will be during the few years succeeding the war. Hence the possibilities for expanding the demand for fish during the next few years are vastly greater than they ever were.

To enable full advantage of these possibilities to be taken, two things are of paramount importance:—

(1) That the railways and express companies provide adequate transportation facilities at reasonable rates; and

(2) That the people of this country and of this continent be made to realize that fish that are properly frozen as soon as they are landed, that are shipped in a frozen condition in refrigerator cars and that are sold retail still frozen, without ever having been thawed, are the next best thing to these fish right at the seaside, as they are delivered from the boats or vessels. There is no room for doubt that fish so handled are much superior to the same fish, if shipped in a fresh, unfrozen condition packed on ice, even in refrigerator cars, when laid down in the interior markets. Also such fresh frozen fish can be shipped in perfect condition to any part of this continent that has railway connection. Furthermore, with a demand for frozen fish there need never be times of shortage and superabundance depending on weather conditions on the fishing grounds, as investigations have demonstrated that frozen fish may be held in storage for months without undergoing the slightest deterioration.

In addition to home consumption, large quantities of fresh frozen fish have been shipped overseas this year for use by the Canadian army there, as well as to supply the domestic needs in Great Britain. Even with the high transportation rates across the ocean, these fish cost less laid down in England than it was possible to purchase similar fish produced there.

The rapid growth in the fresh frozen and mild cured fish trade is being reflected in the fishing industry itself. Better equipment, so as to enable larger landings of fish, is being rapidly introduced. The following statement, showing the growing number of motor boats operated by fishermen in recent years, clearly evidences this:—

Year.	Atlantic Coast.	Whole of Canada.
1910-11.....	2,290	4,588
1913-14.....	5,788	8,700
1914-15.....	6,779	9,302
1915-16.....	8,119	11,097
1916-17.....	9,719	12,828
1917.....	10,761	14,823

Also, this year four steam otter trawlers were in operation on the Atlantic coast and one on the Pacific.

As many of our fishermen enlisted for overseas military service, it became evident early in the year that fewer would be engaging in the industry than previously, notwithstanding the importance of producing even much larger quantities of fish. Hence a call was sent out by the department to the fishermen on all parts of the coast to individually make increased effort to produce more fish. That this call was not in vain seems apparent by the fact that the total landings this year were greater than last, notwithstanding that a considerably fewer number of fishermen were engaged, particularly on vessels.

POSSIBILITIES FOR EXPANSION OF CURED FISH INDUSTRY.

The opportunities for development of our fisheries are not now only along the line of the fresh, fresh frozen and mildly cured business. The markets of the world for dry cured, pickled, cut and canned fish, are available to Canada to a much greater extent than ever before, owing to conditions brought about by the war. We have the fish in abundance. On account of the proximity of the fishing banks to our coasts, we can produce fish cheaply. All that is needed to assure a full share in the world's markets is that by proper handling, curing and packing we produce an article equal to the best procurable anywhere.

It is eminently in the interests of Canada that her fisheries should be developed as rapidly as possible. There is no branch of production that lends itself more readily to the enrichment of the country than its fisheries. They cost nothing to produce, beyond the fishing equipment and the labour employed. Therefore the exportation of fish operates strongly towards a favourable balance of trade.

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FISHERIES EXHIBIT AT TORONTO.

With the object of increasing the demand for fish, the department again this year, for the fifth successive time, made a fisheries exhibit at the Canadian National Exhibition at Toronto, and for the third successive year it had operated in connection with the exhibit a first-class fisheries restaurant.

The exhibit was even better than any of the preceding ones. It embraced not only a thoroughly comprehensive exhibit of frozen fish, but of fresh, canned, cured and boneless fish as well. Models of the most modern fishing vessels and equipment were also shown. The fresh fish were attractively displayed in chilled show cases in a manner that should be generally adopted in retail stores. Booklets containing information regarding our fisheries, and how to clean and cook the different kinds of fish were freely distributed to those interested.

The exhibit was an unqualified success, and like the previous ones it was one of the leading features at the fair. For it, as in the previous years, the department was awarded a gold medal.

The restaurant was also a splendid success. A good fish dinner was served for 35 cents. It was operated in the east wing of the Grand Stand building. The room was commodious and airy. About six hundred could be accommodated at one time. During the days when the attendance at the fair was large, the patronage of the restaurant was limited only by its capacity; 38,772 meals were served during the twelve days the restaurant was in operation.

OYSTER CULTURE.

The officer in charge of this service spent the season in examining and cleaning the public oyster beds so as to increase their productivity, and in assisting those engaging in artificial culture and cultivation by affording them advice, and investigating problems confronting the development of the industry.

For some years past there has been a very large influx of starfish into Richmond bay, Prince Edward Island, the home of the well known Malpeque oyster, and one of the most productive areas in Canada. Until recent years these beds were practically free from starfish or other enemies to the oyster. What the cause of the great inroads of these pests may be is a matter of conjecture, but continuous mopping of the beds to remove them is necessary to prevent them completely over-running the beds.

During the past season a blight was found to have broken out amongst the oysters in Richmond bay, and it soon spread to the beds in all portions of the bay. The department caused immediate investigations to be undertaken by the Biological Board to determine the nature and cause of the blight, and, if possible, to prescribe a remedy. The scientific view is that the oysters are affected by a tubellarian parasite of an undescribed species, similar to that which appeared at times on beds along the coasts of Florida and Connecticut. Science has not yet discovered either the cause or remedy, but experience indicates that it is of comparatively short duration, and disappears entirely after running its course.

It has been suggested that the blight was imported in seed oysters procured in the United States and laid down in the bay by some of those who had undertaken oyster culture there, but so far as this department has been able to ascertain there was not at the time, nor has there been since, any similar blight on the beds, or on those in the vicinity, from which these seed oysters were taken.

Whatever the cause may have been, the outcome is extremely unfortunate, as it seems evident that all the oysters in this magnificent bay, both on the private and public areas, will succumb.

The position of the oyster industry in the Maritime Provinces is an extremely unsatisfactory one. There are in these provinces approximately 10,550 acres of producing natural beds, viz., 5,000 acres in New Brunswick, 4,300 in Prince

Edward Island, and 1,250 in Nova Scotia, but there are tens of thousands of acres around the coasts of these provinces that by proper artificial culture and cultivation could be converted into highly producing oyster areas. Experience in every country where it has been properly tried, shows that oyster farming, though probably somewhat more hazardous, is just as feasible, and usually much more profitable than upland farming. In early years, when the demand for oysters was small, the natural public beds readily yielded all that were needed, but as the demand increased, fishing became more intensive, the beds began to suffer. From time to time the fishing season was curtailed until now it is only about a month or six weeks in the year, but the growing number of fishermen more than offset the shortening of the season, and the beds are now on the verge of commercial exhaustion. Experience, wherever oysters are found, shows that natural beds alone cannot meet the requirements of a growing demand.

As long ago as 1892 the department brought over an expert from England to advise as to the best course to pursue, and his services have since been retained; but under the conditions that have obtained, it has been impossible for him to achieve satisfactory results.

The importance of encouraging private culture and cultivation was years ago realized, and prior to the Privy Council decision in the Fisheries reference, in 1898, a number of leases of areas on which to carry on such operations were granted. Following that decision the provinces claimed that by virtue of it they owned the oyster beds, and therefore that they alone could administer the fishery thereon. The Federal Government took an opposite view, so that neither one nor the other was in a position to grant leases of a satisfactory nature, and nearly all those that had previously been issued were allowed to terminate. Negotiations for some settlement of the whole question of fishery rights as between the Dominion and provinces went on intermittently, but year by year went by without anything definite being accomplished, and meantime the public beds were continuously going down.

Finally in 1910 this department endeavoured to have the deadlock broken by entering into a *modus vivendi* with the provinces by which, pending the settlement of the legal points at issue, the administration of the industry would be placed in its hands on the understanding that if it were ultimately decided that the contention of the provinces were correct, a proper accounting for fees collected would be made to them, and that they would sustain those to whom leases might have been granted, in their holdings. To this, all the provinces were not prepared to agree, but they all expressed a readiness to undertake themselves the administration of the industry, so far as the leasing of private areas is concerned, and the building up of a business in the culture and cultivation of oysters.

In the circumstances the department decided to ask for the necessary legislation to enable this to be done, and in 1910 the Fisheries Act was amended so as to authorize agreements to be entered into with the different Provincial Governments whereby they would be empowered "to grant leases of such areas of the sea coast, bays, inlets, harbours, creeks, rivers, and estuaries of such provinces as the Government of such provinces considers suitable for the cultivation and production of oysters." Following this legislation, enabling agreements were entered into with the different sea-washed provinces, and it is understood that some leases of areas have been issued in each of the three Maritime Provinces, though outside of New Brunswick little progress has apparently been made.

The provinces, however, were not prepared to take over the administration of the public beds as well, so that the unsatisfactory and indeed largely unworkable condition of dual control still exists. It is clearly in the public interest that this should be ended, and it is hoped that some way of accomplishing this will shortly be found.

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The possibilities of the building up of a very large oyster and other mollusk industry are obvious, but in the initial stages, which must be largely experimental, the most careful guiding and control is essential. Under proper conditions there seems no reason why a business could not be built up that would produce a total annual revenue to those engaging in it that would run into millions of dollars.

FISHERIES MUSEUM.

The excellent Fisheries Museum, which was being built up in Ottawa, had to be dismantled during the year, as the building used was demolished to give place to a large government office building. As no other suitable building was available, most of the specimens had to be stored. Some have been placed in the Victoria Memorial Museum, which is now being used for parliamentary purposes, and some models of fishing equipment were sent to the commercial exhibit of the Department of Trade and Commerce.

As Canada has fisheries second to none in the world, it is fitting that there should be in the Capital a Fisheries museum that would be equal to the best anywhere. It is hoped that when the days of peace return it will be found feasible to erect a proper building for this purpose.

The curator of the museum, who is also the department's naturalist, has been detailed to assist Dr. A. P. Knight, of the Biological Board, in a study of the natural history of the lobster.

FISHING BOUNTY.

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels", the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1917, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$6.30 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen, entitled to receive bounty, \$3.85 each.

There were 14,532 bounty claims received, and 14,516 paid. In the preceding year, 13,604 claims were received, and 13,593 paid.

The total amount paid was \$159,893.10, allocated as follows:—

To 812 vessels and their crews \$52,748.20.

To 13,704 boats and their crews \$107,144.90.

The following table shows in detail the payment of the bounty by counties for the year 1917:—

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Provinces and Counties.	Number of Vessels.	Tonnage	Average tonnage.	Number of men.	Amount paid.	Number of Boats.	Number of men.	Amount paid.	Total Bounty paid to Vessels and Boats in 1917.
Nova Scotia:—					\$ cts.			\$ cts.	\$ cts.
Annapolis.....	—	—	—	5	31 50	179	293	1,307 05	1,338 55
Antigonish.....	—	—	—	—	—	174	246	1,121 10	1,121 10
Cape Breton....	17	269	16	90	836 45	498	934	4,094 65	4,931 10
Cumberland....	1	15	15	3	33 90	4	7	31 70	65 60
Digby.....	12	550	46	99	1,173 70	417	718	3,181 30	4,355 00
Guysborough....	58	901	16	263	2,560 00	812	1,277	5,726 95	8,286 95
Halifax.....	80	1,253	16	344	3,422 00	1,203	1,651	7,559 60	10,981 60
Inverness.....	26	355	13	127	1,157 20	458	917	3,988 45	6,145 65
Kings.....	4	54	14	16	154 80	52	74	336 90	491 70
Lunenburg.....	165	8,323	50	2,120	21,681 25	686	849	3,955 65	25,636 90
Pictou.....	3	58	19	10	121 15	81	107	492 95	614 10
Queens.....	17	193	11	57	553 60	193	309	1,382 65	1,936 25
Richmond.....	31	816	26	213	2,160 00	498	828	3,685 80	5,845 80
Shelburne.....	45	1,027	23	314	3,007 75	693	1,238	5,459 30	8,467 05
Victoria.....	11	146	13	58	513 50	324	476	2,160 70	2,674 20
Yarmouth.....	26	995	38	288	2,811 65	168	323	1,411 55	4,223 20
Totals.....	496	14,955	30	4,007	40,218 45	6,440	10,247	45,896 30	86,114 75
New Brunswick:—									
Charlotte.....	15	256	17	61	646 60	441	694	3,115 40	3,762 00
Gloucester.....	265	3,759	14	1,074	10,527 45	207	488	2,085 80	12,613 25
Kent.....	10	104	10	21	236 30	29	43	194 55	430 85
North'berland..	4	81	20	17	186 90	6	12	52 20	239 10
Restigouche....	—	—	—	—	—	6	16	67 60	67 60
St. John.....	4	73	18	11	142 45	48	61	283 10	425 55
Totals.....	298	4,273	14	1,184	11,739 70	737	1,314	5,798 65	17,538 55
Prince Edward Island:—									
Kings.....	2	37	18	7	81 10	507	742	3,364 70	3,445 80
Prince.....	8	114	14	32	315 60	543	1,323	5,654 55	5,970 15
Queens.....	4	46	11	14	134 65	130	279	1,205 00	1,339 65
Totals.....	14	197	14	53	531 35	1,180	2,344	10,224 25	10,755 60
Quebec:—									
Bonaventure....	1	16	—	3	34 90	970	1,722	7,607 20	7,642 10
Gaspé.....	2	24	12	19	145 35	3,201	6,495	28,257 55	28,402 90
Rimouski.....	—	—	—	—	—	96	137	623 55	623 55
Saguenay.....	1	15	15	10	78 45	1,080	1,974	8,737 40	8,815 85
Totals.....	4	55	14	32	258 70	5,347	10,328	45,225 70	45,484 40
Grand totals.....	812	19,480	24	5,276	52,748 20	13,704	24,233	107,144 90	159,893 10

FISH CULTURE.

The operations carried on from April 1 to December 31, 1917, were confined almost entirely to the propagation of the commercial food fishes, such as Atlantic salmon and lobsters in the Maritime Provinces, whitefish, lake herring, salmon trout, and pickerel in Ontario and the Prairie Provinces; and Pacific salmon in British Columbia.

The commercial species are practically all distributed as fry on the natural spawning areas, and mainly where the eggs had been collected. A small, but growing percentage is reared to the fingerling size. The purely sporting fishes are hatched in small numbers. After adequate return of the fry has

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been made to waters from which the eggs were obtained, the greater part of the remainder is distributed in publicly controlled waters, on application, while a small proportion is supplied to privately controlled or leased waters on payment of fixed prices and all transportation charges.

Owing to war conditions, no new hatcheries were erected. A shortage of labour, a scarcity of fish in some districts, and unfavourable weather conditions in others, resulted in a decreased collection of eggs, and in the hatcheries not all being filled to capacity.

There are fifty hatcheries, fourteen of which are lobster hatcheries. There are also eleven subsidiary hatcheries, six salmon retaining ponds, and one lobster pound in operation. From these the total distribution of the various species in each province during the season of 1917 was as follows:—

Nova Scotia—	
Atlantic salmon.....	7,176,650
Speckled trout.....	203,400
Lobsters.....	304,589,950
New Brunswick—	
Atlantic salmon.....	10,333,255
Speckled trout.....	106,401
Quanniche salmon.....	580
Rainbow trout.....	8,000
Shad.....	400,000
Lobsters.....	138,987,000
Prince Edward Island—	
Atlantic salmon.....	1,000,000
Speckled trout.....	241,400
Lobsters.....	108,000,000
Quebec—	
Atlantic salmon.....	6,385,825
Speckled trout.....	164,690
Quanniche salmon.....	10,000
Lobsters.....	63,220,000
Ontario—	
Speckled trout.....	500
Herring.....	55,850,000
Pickarel.....	169,000,000
Salmon trout.....	32,405,170
Whitefish.....	177,535,000
Manitoba—	
Pickarel.....	15,824,000
Whitefish.....	277,100,000
Saskatchewan—	
Whitefish.....	42,497,000
Alberta—	
Atlantic salmon.....	103,849
Cutthroat trout.....	374,527
Lake herring.....	2,189,000
Salmon trout.....	281,114
British Columbia—	
Atlantic salmon.....	245,050
Speckled trout.....	137,965
Coho salmon.....	2,542,210
Cutthroat trout.....	493,201
Dog salmon.....	4,988,600
Kamloops trout.....	653,453
Rainbow trout.....	16,200
Sockeye salmon.....	73,142,820
Spring salmon.....	3,249,540
Steelhead salmon.....	26,304
Total distribution.....	1,499,482,660

The department is indebted to the United States Bureau of Fisheries for a present of 10,000,000 sockeye eggs from Alaska. The eggs were placed

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in a British Columbia hatchery, and the fry will be distributed in the Fraser river.

Evidence of the most satisfactory results from the department's fish cultural operations is apparent on all sides. The catch of whitefish per net in lake Winnipeg was never better than during the current season. The fishery for whitefish in lake Erie, the greatest whitefish-producing area in Canada, and in lake Ontario, tends rapidly towards the prosperous condition in which it formerly was. The salmon rivers of Quebec and the Maritime Provinces were never in better condition; the spawning areas are covered with salmon which are forcing their way into the highest tributaries of the various rivers.

Similar results are not apparent from the lobster hatcheries. Indeed, there is not satisfactory evidence to show that they are even proving beneficial. Hence it has been decided not to operate them during the year 1919.

A detailed report on the fish cultural operations of the department is being published separately in pamphlet form.

BIOLOGICAL STATIONS.

The Atlantic and Pacific biological stations carried on their work actively during the season of 1917.

At St. Andrews, N.B., investigations of a practical and scientific nature were conducted by representatives of the various universities of Canada. One of the chief aims of the researches was to investigate the kinds of fish and marine animals that could be used for food, but have hitherto been neglected. The reports on the investigations, when completed, should be of much practical value.

In connection with the work at St. Andrews, a survey of the fisheries conditions in the eastern part of the gulf of St. Lawrence was undertaken from Eastern harbour in Cape Breton as a base.

For three months the staff, under Dr. A. G. Huntsman, made constant trips over the fishing grounds and accumulated a large mass of observations. Much attention was devoted to the spawning of herring at the Magdalen islands, and the drift of the larvæ; also to hydrographic and plankton studies in sections of water between cape Breton and the Magdalen islands, and from Aspy bay out to a depth of 200 fathoms.

Dr. Knight, of Queens University, carried out an important investigation at Caribou harbour, Nova Scotia, in continuation of his lobster researches.

The pearly fresh-water mussel resources of Ontario were studied, and a report made thereon, which has been published.

At Nanaimo, B.C., work was carried on under the supervision of Dr. C. McLean Fraser, curator of the Pacific coast station. Studies of the life-history of British Columbia salmon were continued and results published in the form of special reports. The marking of salmon was also continued; while the study of fish parasites, hydroids, and a great variety of marine animals was completed.

FISH INSPECTION.

The season of 1917 was the third in which inspection of pickled fish was carried on. There were presented for inspection and the brand, 8,977 barrels of herring, alewives, and mackerel. Of these, 3,083 barrels failed to pass inspection because of either the poor condition of the fish, bad grading, or inferior barrels. In the preceding year, 7,213 barrels were inspected, while in the year before that, which was the first, there were 1,328 barrels presented for inspection. The number of packers who submitted their fish for inspection was eighty, against seventy-three in the season of 1916 and sixteen in that of 1915.

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The Inspection Act compels no one to submit either his barrels or fish for inspection, and, therefore, results are dependent on the educative and persuasive efforts of the department, through its inspecting officers. During the season, and prior to its opening, fishermen and packers were visited regularly, and the requirements of the Act, with respect to the manner in which their fish should be cured, pointed out to them. Coopers' shops also were visited, and practical instruction in barrel making given to the coopers. Further, simply worded pamphlets of instruction in barrel making and herring curing in the Scotch method were published by the department early in the year, and copies distributed by the inspecting officers.

Keeping in mind the fact that inspection is entirely voluntary on the part of packers and that the carrying out of such often involves them in a considerable amount of extra labour, it affords a considerable amount of satisfaction to be able to show that more packers presented their fish for inspection, and that more fish were inspected, than in the two preceding years.

Much good work has been accomplished since the passing of the Act, especially in connection with the adoption of a higher grade barrel. Many coopers, however, persist in making barrels as of old. This is encouraged to some extent by a certain class of packer who considers only the few cents he wrongly thinks he saves by buying the cheaper, poor barrel, and will doubtless continue so long as our officers are without the power to enforce the production of a standard package.

The present abnormal demand for pickled fish in the United States, due to lack of supplies from Europe, made it possible, in the course of the year under review, to dispose of fish of indifferent cure, packed in inferior barrels, at prices which seemed high compared with those of normal times. For this reason many packers were hard to convince of the necessity for exercising greater care and producing a first-class article, notwithstanding that properly cured fish packed in good barrels in every case secured a better price than the other kind. For example, while some packers obtained \$7 to \$8 for split herring, and \$10, \$12, \$13, and even up to \$15 per barrel on the spot for herring cured in the Scotch style, others who carefully followed the department's instructions got \$20 and up to \$22 per barrel.

CANNERY INSPECTION.

Under authority of the Meat and Canned Foods Act, all establishments in which fish of various kinds are canned were systematically inspected during the season of 1917. The inspections were undertaken on both coasts by the department's fishery overseers.

The duties of the inspecting officers, as in the past, consisted of supervising the sanitary conditions of each canning establishment, and the utensils used therein; the cleanliness of the employees; the condition of the fish previous to canning; and the manner in which the product is handled.

During the year there were in operation on the Atlantic coast 660 establishments canning lobsters, and 18 canning other fish such as sardines, herring, haddock, mackerel, and clams, while on the Pacific coast there were 93 salmon canneries operated; making a grand total of 771. The total number of inspections made and reported on was 2,364.

In the course of the year the Meat and Canned Foods Act was amended to enable the department to deal more effectively with the canning of fish. Regulations for carrying out the provisions of the amended Act have been framed and adopted, but these will not come into effect till December 15, 1918.

BAIT-REPORTING SERVICE.

To assist masters of fishing vessels to locate bait supplies during the cod-fishing season, and minimize the time lost in searching from harbour to harbour for bait, there has been in operation, since the season of 1913, a system by which definite information as to the amount of bait landed along certain stretches of the Atlantic seaboard is collected by the local officer of the department and despatched daily by telegram to certain important points, and there posted up.

During the season of 1917 the service was carried on as usual. Each telegram contained definite information as to bait supplies at all important points within the district of the officer who sent the message. Copies of all telegrams were mailed to the department at the end of each week, and the work closely followed and checked.

During the spring months of 1917, 100 telegrams were sent from the Magdalen islands, Souris, P.E.I., and Queensport, N.S., to Canso, Halifax, Lunenburg, and Riverport, N.S.

During July and August, 203 telegrams were sent from Little Bras d'Or, L'Ardoise, Canso, Wine Harbour, and Musquodoboit Harbour, N.S., to North Sydney, Canso, Halifax, Lunenburg, and Shelburne, N.S.; also from Lockeport, N.S., to Canso and Halifax, N.S., and from Shag Harbour and Digby, N.S., to Halifax, Shelburne, and Lockeport, N.S.

From the beginning of September to the middle of November, 46 telegrams, covering information from the counties of Charlotte and St. John, N.B., were sent from Campobello, N.B., to Digby, Yarmouth, Pubnico, and Clark's Harbour, N.S.

This service is being appreciated more and more from year to year, and those in the trade who are interested in the landings of herring, either for bait or food purposes, find that the information furnished is of much benefit to them.

STATISTICAL WORK.

The system in operation by which the statistical information concerning the sea fisheries is collected and compiled, may be described briefly as follows: Each overseer in the course of his rounds gathers from fishermen and fish merchants, details of the quantity and value of fish landed in his district during the current month. From outlying points that cannot be visited with sufficient frequency by the overseer, the information is supplied to him by a local correspondent.

The information thus collected is despatched to Ottawa on a special form, during the first days of each succeeding month. A copy is sent, at the same time, to the Inspector of Fisheries under whose jurisdiction the overseer is, in order that he may follow and check the work of collection.

At Ottawa the monthly returns are checked and compiled to show the totals for each county, for each province, and for the whole of Canada. This information is published monthly in the form of a bulletin, which also contains summarized results of the fisheries in the United States, Newfoundland, the United Kingdom, Norway, and, prior to the outbreak of war, Germany.

At the end of the fishing season, or at the end of the statistical year, before making up his annual returns, each overseer, in inland as well as in sea-fishing districts, visits all parts of his district and obtains more complete information as to the year's catch and its disposal in a fresh, dried, smoked, etc., state. This information reaches the department through the inspectors of fisheries, who check and compile the figures for their respective districts. In the department the figures are again checked. The fuller information is then published in the annual report.

A state of complete satisfaction has not yet been reached with the work of collecting our general fisheries statistics. For no matter how perfect the

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system is, nor how closely the figures are scrutinized afterwards, the department must rely largely on the intelligence and honesty of its outside officers for accurate returns. It may be safely stated, however, that since the adoption of the present system, in 1910, our published statistics are sufficiently near the mark to enable any one who studies them intelligently to arrive at accurate conclusions as to the upward or downward trend of any particular fishery.

EXPENDITURE AND REVENUE.

The total expenditure for all fisheries services, except civil government, for the fiscal year ended March 31, 1918, amounted to \$951,384.32.

The total net fisheries revenue from rents, fines, sales, and license fees, including *modus vivendi* licenses to United States vessels, for the same period amounted to \$118,751.39.

The following is a summary of the sums appropriated and those expended for the various services during 1917-18:—

FISHERIES EXPENDITURE, 1917-18.

Service.	Appropriation.	Expenditure.
	\$	\$ cts.
Salaries and Disbursements Fishery Officers.....	305,000	267,210 21
Fish Breeding.....	400,000	270,796 95
Fisheries Patrol Service.....	190,000	187,839 47
Cold Storage and Transportation of Fresh Fish.....	125,000	116,578 91
Dog Fish Reduction Works.....	60,000	38,036 74
Canadian Fisheries Museum.....	8,000	4,833 65
Building Fishways and clearing rivers.....	30,000	8,975 39
Legal and Incidental Expenses.....	4,000	2,452 24
Oyster Culture.....	6,000	5,003 18
Customs officers <i>re Modus Vivendi</i> Licenses.....	900	289 65
Fisheries Intelligence Bureau.....	5,000	2,873 45
Toronto Exhibition.....	10,000	9,854 72
Inspection of Canned and Pickled Fish.....	25,000	10,639 76
Marine Biological Board.....	26,000	26,000 00
Totals.....	1,194,900	951,384 32
Fishing Bounty.....	160,000	159,893 10

The following table shows certain items of fisheries expenditure for 1917-18, by provinces; details will be found in the Auditor General's Report under the proper headings:—

Provinces.	Salaries and Disbursements Fishery officers.	Fish Breeding.	Fisheries Patrol Service.	Building Fishways and clearing rivers.	Inspecting Canned and Pickled Fish.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	64,537 48	36,057 56	33,673 94	343 72	5,773 31
Prince Edward Island.....	11,097 11	7,994 24	5,697 91		1,647 80
New Brunswick.....	55,124 91	37,021 09	16,195 61		2,899 71
Quebec.....	7,199 95	19,727 25	42,752 33	42 45	50 00
Ontario.....		69,864 18			
Manitoba.....	13,164 99	28,277 84	18,943 45		
Alberta.....	13,262 62	4,127 81			
Saskatchewan.....	16,959 11	5,732 96			
British Columbia.....	62,259 06	54,359 16	63,510 80	8,589 22	100 00
Yukon Territory.....	1,530 75		7,065 43	168 94	
General Account.....	22,074 23	7,634 26			
Totals.....	267,210 21	270,796 95	187,839 47	8,975 39	10,639 76

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FISHERIES REVENUE FOR FISCAL YEAR ENDED MARCH 31, 1918.

Provinces.	Amount Collected.	Refunds.	Net Amount.
	\$ cts	\$ cts.	\$ cts.
Ontario.....	2,345 48		2,345 48
Quebec.....	7,664 73		7,664 73
New Brunswick.....	14,439 53	10 00	14,429 53
Nova Scotia.....	6,663 94		6,663 94
Prince Edward Island.....	3,260 26	4 00	3,256 26
Manitoba.....	12,910 65		12,910 65
Saskatchewan.....	3,643 65		3,643 65
Alberta.....	9,777 94	10 00	9,767 94
British Columbia.....	53,665 21	150 00	53,515 21
Yukon.....	375 00		375 00
	114,746 39	174 00	114,572 39
Modus Vivendi Licenses.....	4,387 50	208 50	4,179 00
Grand Total.....			118,751 39

PRODUCTION AND VALUE OF THE FISHERIES.

WHOLE OF CANADA.

The marketed value of our fisheries for the year 1917 amounted to \$52,312,044. This is an increase of \$13,103,666 over the value for the preceding year, which in turn was considerably higher than that for any previously recorded year. To the total the sea fisheries contributed \$47,012,605 and the inland fisheries \$5,299,439.

Each province shows a greater value; but British Columbia with \$6,881,249 more, and Nova Scotia with an increase of \$4,375,417, are mainly responsible for the big increase.

The value of the fishery products of the various provinces in 1917 and the four preceding years may be readily compared by glancing at the following table:—

—	1917	1916-17	1915-16	1914-15	1913-14
	\$	\$	\$	\$	\$
British Columbia.....	21,518,595	14,637,346	14,538,320	11,515,086	13,891,398
Nova Scotia.....	14,468,319	10,092,902	9,166,851	7,730,191	8,297,626
New Brunswick.....	6,143,088	5,656,859	4,737,145	4,940,083	4,308,707
Quebec.....	3,414,378	2,991,624	2,076,851	1,924,430	1,850,427
Ontario.....	2,866,419	2,658,993	3,341,182	2,755,291	2,674,685
P. E. Island.....	1,786,310	1,344,179	933,682	1,261,666	1,280,447
Manitoba.....	1,543,288	1,390,002	742,925	849,422	606,272
Saskatchewan.....	320,238	231,946	165,888	132,017	148,602
Alberta.....	184,009	144,317	94,134	86,720	81,319
Yukon.....	67,400	60,210	63,730	69,725	68,265
Totals.....	52,312,044	39,208,378	35,860,708	31,264,631	33,207,748

The price of all kinds of fish was higher than in the preceding year, but the greater total value is not due altogether to that circumstance. The catches of salmon, cod, haddock, pollock, and mackerel were considerably greater. On the other hand, the herring catch was a good deal less, while the lobster catch was slightly less, notwithstanding an extension of the fishing season.

There were 95,198 persons engaged in the various branches of the fishing industry afloat and ashore during 1917. Compared with the preceding year this shows a decrease of 106. Of the total 84,270 were engaged in the sea fisheries and 10,928 in the inland fisheries. There were 8,946 on vessels, tugs, and

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smacks; 62,700 in boats; 744 fishing without boats; and 22,808 working in canneries, freezers, smoke-houses, etc., cleaning and preparing the fish for market.

The amount of capital represented in material such as vessels, boats, fishing gear, and fish-curing establishments is \$37,169,328, of which \$34,062,588 is credited to sea fisheries and \$3,106,740 to inland fisheries.

The fishing industry is somewhat different from other food-producing industries, in that operations are affected not only by weather conditions but by the abundance or scarcity of bait and the erratic and unknown movements of the schools of fish. It is not always the case, therefore, that the employment of a greater number of men and vessels results in a greater production of fish, especially with our present means of capture. For example, the Lunenburg bank fishing fleet of 1917 was the smallest in the past ten years, with the exception of one year, yet the catch was the largest on record. The sardine and large-herring fishery in the Bay of Fundy of 1917 fell far short of that of the preceding year, notwithstanding the operations of fully as much fishing gear and greater preparation for dealing with the catch. Taken as a whole, the operations of our fishermen were successful, from the point of view of quantity taken, as well as remunerative. This will be gathered from the following table which I give to show the relative quantities and values of the chief commercial fishes, returning \$100,000 and upwards, in their order of rank, landed in the whole of Canada during the year under review and the four preceding years:—

	1917	1916-17	1915-16	1914-15	1913-14
Salmon..... cwt.	1,642,740	1,239,668	1,410,769	1,409,828	1,551,411
\$	17,411,029	10,882,431	11,262,381	8,560,386	10,833,713
*Cod..... cwt.	2,302,987	2,026,231	2,152,756	1,820,025	1,664,599
\$	8,281,920	5,449,964	4,459,496	3,886,134	3,387,109
Lobsters..... cwt.	474,871	480,898	445,277	408,816	514,646
\$	5,654,265	5,508,054	4,506,155	4,339,929	4,710,062
Herring..... cwt.	1,481,708	1,751,314	1,894,774	2,118,291	2,484,219
\$	3,693,688	3,050,421	2,906,887	2,735,257	3,173,129
Haddock..... cwt.	712,416	582,028	582,522	566,002	405,633
\$	2,936,719	1,711,271	2,232,022	1,244,840	841,511
Halibut..... cwt.	140,024	142,823	226,151	239,920	256,096
\$	2,066,635	2,263,573	2,261,776	1,793,283	1,036,400
Sardines..... brls.	274,359	315,832	333,794	298,885	141,384
\$	1,910,705	1,481,261	1,229,096	1,349,615	676,668
Mackerel..... cwt.	167,067	156,075	180,990	143,712	215,442
\$	1,333,354	924,746	990,329	826,846	1,280,319
Whitefish..... cwt.	178,838	164,992	153,529	159,894	137,887
\$	1,248,006	1,135,486	1,048,641	975,685	929,962
Smelts..... cwt.	73,153	68,029	67,067	93,771	88,728
\$	1,027,555	847,357	632,733	837,682	810,392
Hake and cusk..... cwt.	321,605	385,953	379,959	262,897	353,598
\$	890,265	757,456	520,051	313,921	490,979
Trout..... cwt.	73,662	88,071	115,999	67,890	73,164
\$	699,950	741,610	870,209	623,504	682,619
Pickarel..... cwt.	86,425	105,428	55,722	97,555	61,603
\$	650,632	871,719	901,183	657,783	449,539
Pollock..... cwt.	189,908	143,306	138,801	159,788	150,094
\$	486,195	268,756	193,788	214,195	187,723
Pike..... cwt.	79,383	73,993	69,229	97,724	64,925
\$	429,366	404,453	347,355	469,919	372,868
Tullibee..... cwt.	64,910	58,537	55,787	50,946	20,157
\$	333,686	301,060	165,569	156,529	63,910
Clams and quahaugs.... brl.	55,655	54,942	73,713	87,972	121,135
\$	222,965	195,805	240,611	282,876	368,325
Alewives..... cwt.	98,277	80,020	97,032	90,935	61,768
\$	196,482	117,083	120,126	106,906	85,445
Perch..... cwt.	24,707	22,773	19,218	23,062	14,497
\$	126,723	114,656	98,119	115,220	72,985
Oysters..... brl.	13,632	18,361	21,386	26,545	29,828
\$	109,265	147,751	147,628	177,979	173,753

* Black cod included.

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ATLANTIC FISHERIES.

Cod, Haddock, Hake, Cusk and Pollock.

A much greater quantity of cod was taken in 1917 than in any of the four preceding years. The catch on some parts of the coast was rather poor, notably on the northern coast of New Brunswick, where adverse weather interfered with the work of fishing, and on the coast of Bonaventure and part of Gaspé, where the fish did not appear until the fall.

Elsewhere cod were plentiful, and the high prices paid induced fishermen to prosecute the fishery with more than usual vigour. In the district westward of Halifax, N.S., which includes the headquarters of the off-shore bank fishing fleet, there was a very large increase in the catch of cod.

Over 90 per cent of the whole production of haddock is landed by the fishermen of Nova Scotia. In the eastern part of the province there was a remarkable increase due mainly to the successful operation of trap nets at Ingonish, Victoria county. There was also a great increase in the central part, that is, between Canso and Halifax. The operation of two steam trawlers no doubt added much to the production of haddock in this section. In the western part of the province, on the other hand, there was a decrease in the quantity taken.

While considerable quantities of hake and pollock are taken in the gulf waters between Inverness county, Nova Scotia, and Kings county, Prince Edward Island, and off the eastern parts of the south coast of Nova Scotia, the great producing area lies at the mouth of and in the Bay of Fundy. Hake are landed in largest quantities by the fishermen of Digby county, Nova Scotia, and pollock by the fishermen of Charlotte and St. John counties, New Brunswick. There was an increase in the quantity of hake landed eastward of Halifax, but it was not sufficient to offset a decrease in the landings in the western part of Nova Scotia and Charlotte and St. John counties. On the other hand there was a larger catch of pollock all over.

The proportion of the catch of cod, haddock, hake and pollock that is dried for market grows less year by year. More of it is being marketed in a fresh or frozen condition; in a semi-soft or salted condition, as boneless; in a smoked condition as finnan haddies or fillets; and in cans, either fresh or smoked. The increased demand for the fish prepared in these ways has greatly enhanced its value, and has had much to do with the great advance in the price of dried fish in recent years.

Herring, Sardines, and Mackerel.

The catch of herring was much below the average. On all parts of the Nova Scotia coast it was rather greater, but in the gulf of St. Lawrence, chiefly along the shores of the northern counties of New Brunswick and the Magdalen islands, where more than half the total Atlantic herring catch comes from, much smaller quantities than usual were taken.

These fish are in greatest abundance during the spring months in the gulf and as drift ice remained in the bays and harbours longer than usual, the bulk of the fish had spawned and moved away before the fishermen were in a position to put out their fishing gear.

Of the total catch of herring on the Atlantic coast, 29 per cent was marketed in a fresh, smoked, or canned state; 30 per cent was marketed as pickled fish; 29 per cent was used as bait in the lobster fishery and in the fishery for cod, haddock, etc. About 12 per cent of the catch was used for fertilizing the land, mainly along the gulf shores.

While it is regrettable that so large a proportion of the catch should be used as fertilizer, it must not be forgotten that the fish so used are those caught in

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the spring time, and as they are usually in great abundance the fishermen's nets sometimes secure more than they can use for bait, and as such fish are useless for any other purpose after they have spawned, it would be absolute waste to throw them back into the sea rather than use them to fertilize farming lands.

The sardine fishery is confined to the Bay of Fundy district and mainly to Charlotte and St. John counties, New Brunswick. The total catch was the smallest in the last four years, but high prices more than made up for the decrease in quantity. The bulk of the fish was sold fresh for canning purposes in the state of Maine. Two establishments in the province of New Brunswick, however, canned 168,000 cases, which, notwithstanding the smaller catch, is 15,000 cases greater than their pack in the preceding year.

The total catch of mackerel was larger than that of the year before, but the fish were not equally abundant on all parts of the coast. Along the south shore of Nova Scotia and northern New Brunswick mackerel were plentiful and large quantities were taken. In the Magdalen Islands and Prince Edward Island districts the quantity landed, of fall fish especially, was much smaller than usual.

About 44 per cent of the mackerel catch was marketed fresh or frozen, about 53 per cent was cured in salt, and about 3 per cent canned. The United States is the principal market for salted mackerel, and as that market was unable to obtain its usual supplies from Europe, the demand for Canadian mackerel was unusually good, and prices advanced to nearly 100 per cent over normal, especially for fat fall fish.

The quantity of each of the kinds mentioned above landed in the last five years are shown in the following table:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
Cod..... cwt.	2,215,455	1,962,860	2,116,886	1,772,864	1,635,379
Haddock..... "	712,416	582,028	582,522	566,002	405,633
Hake and cusk..... "	321,412	385,953	379,959	262,897	353,598
Pollock..... "	189,908	143,306	138,801	159,788	150,094
Herring..... "	787,681	1,145,229	1,309,952	1,462,578	1,703,543
Sardines..... brl.	274,359	315,832	336,794	298,885	141,384
Mackerel..... cwt.	167,067	156,075	180,990	143,712	215,442

Other Sea Fish.

The quantity of halibut landed, by Nova Scotia fishermen chiefly, was over 30 per cent greater than the preceding year's catch. The landings of flat fishes exceeded those for 1916 by about 27 per cent. Skate is being more and more utilized for food purposes, and the quantity landed during 1917 increased by about 55 per cent. Tom cod are caught chiefly on the north coast of New Brunswick during the winter season. The catch shows a slight decrease. Over 100 per cent more swordfish were taken, but the catch of albacore was less by about 12 per cent. The fishery for swordfish and albacore is practically confined to the coast of Nova Scotia. About the usual quantities of bait fish, such as squid and caplin, were taken.

Shellfish.

The lobster fishery is the most important shell fishery we have. In point of value it ranks next to the cod fishery. The total catch in 1917 fell short of that of the preceding year by about $1\frac{1}{4}$ per cent, notwithstanding the extension of the fishing season for a month longer than usual over all the gulf of St.

Lawrence. It should be noted, however, that the catch in 1916 was 8 per cent greater than that in 1915 and 17 per cent greater than that in 1914.

In Charlotte and St. John counties, New Brunswick, there was a slight increase, but the total was considerably less than the average. In the western part of Nova Scotia there was a decrease of 16 per cent. The fishing began in mid-winter in this district, and many traps and boats were destroyed by storms during the opening months, which in a large measure, no doubt, accounts for the decrease there. In the section which embraces the counties of Halifax and Guysborough, there was a decrease of 20 per cent, but farther east in Cape Breton Island district the fishery resulted in a slight increase.

In the Prince Edward Island district the catch was extremely poor at the beginning of the season, owing to the prevalence of unfavourable weather. The extension of the season, however, for a month, gave an increase over the preceding year of 11 per cent, but it has to be noted in this connection that the catch in the preceding year was about 30 per cent greater than that in either 1915 or 1914.

In the New Brunswick counties which border the gulf there was an increase of about 7 per cent. This was mainly due to the extra month's fishing—the early part of the season being rough and fishing poor. As in the case of Prince Edward Island, the result of the preceding year's fishing was over 30 per cent greater than that in 1915 or 1914. There was a slight decrease in the province of Quebec, due to stormy weather on the Gaspé coast.

There were 660 establishments engaged in canning lobsters on various parts of the coast, and the output amounted to 195,993 cases of 48 pounds each. There were 84,569 hundredweights shipped fresh in shell to market.

The oyster catch on the Atlantic coast was 4,956 barrels less than that in the preceding year. Unfortunately, the production has been falling off from year to year for some time. The oyster beds are located mainly along the shores of northern New Brunswick, Prince Edward Island, and the gulf shores of Nova Scotia. In all three provinces the decrease was common. It is hoped that private culture, which is now being taken up, and more restrictive regulations, will prevent further diminution.

There was a slight decrease in the catch of clams of various kinds. About 40 per cent of the total was canned. Part of the balance was consumed fresh and part used as bait.

The following table is given to show the comparative landings of the chief kinds of shell fish in the past five years:—

		1917.	1916-17.	1915-16.	1914-15.	1913-14.
Lobsters.....	cwt.	474,871	480,898	445,277	408,816	514,646
Oysters.....	brl.	11,483	16,799	20,296	24,777	27,148
Clams.....	"	50,257	53,864	63,065	75,031	104,768

River-Spawning Sea Fish.

The total catch of Atlantic salmon was about an average one. It was not equally good on all parts of the coast, however. There were very few salmon in the principal spawning rivers of Cape Breton island, more particularly Victoria and Inverness counties, and the quantity taken was therefore smaller than that in the preceding year. In the counties of Nova Scotia, south and westward from the gulf to and including Hants and Halifax, the catch was the best in the past twenty years with the exception of one. There was also an increase in the Nova Scotia counties still farther to the westward.

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There was a considerable falling-off in the quantity taken by the fishermen of Charlotte and St. John counties, New Brunswick. Drift-net fishermen found salmon plentiful in the Bay of Fundy, but unfavourable weather retarded operations. Salmon fishing on the St. John river was rather disappointing. On the north shore of New Brunswick, where the Restigouche, Miramichi, and other large though less important rivers empty into the gulf, there was an all-round decrease of 269 hundredweights. Greater catches were landed in the counties of Westmorland, Kent, and Gloucester, but in Northumberland county, and mainly in Miramichi bay, the catch was almost 2,000 hundredweights less. Stormy weather is said to have curtailed operations. The quantity taken in Restigouche county was slightly less than that in the preceding year.

In the province of Quebec the catch was over 1,200 hundredweights short of last year's, owing to storms during May, and the flooding of rivers by heavy rains.

The catch of smelts was greater by 5,194 hundredweights. Almost 78 per cent of the total catch was produced in the northern New Brunswick counties. In that section of the coast the increase amounted to 523 hundredweights. In other parts of the coast the increase was greater, relatively.

The catch of alewives was above the average of the last five years. The increase over last year was 18,000 hundredweights. In St. John harbour, where 56 per cent of the total landings was taken, there was an increase of 15,000 hundredweights. In the western part of Nova Scotia there was a very considerable decrease. About 75 per cent of the catch was cured in salt, for which there was a good demand at good prices. Part of the balance was consumed fresh or smoked, and a part used as bait.

The catch of shad was about 20 per cent less than in 1916. Compared with the years 1913 and 1914, however, 1917 shows an increase of 43 per cent over the former and 30 per cent over the latter.

The following table shows the quantities of the chief river-spawning sea fish taken during 1917 and the four preceding years:—

		1917.	1916-17.	1915-16.	1914-15.	1913-14.
Salmon.....	cwt.	39,865	41,801	39,805	38,202	40,237
Smelts.....	"	71,989	66,795	65,074	91,634	86,538
Alewives.....	"	98,277	80,020	97,032	90,935	61,768
Shad.....	"	6,970	8,388	9,367	5,351	4,855

Seals.

The seal hunt in the gulf of St. Lawrence resulted in the capture of 31,145 hair seals against 23,227 in the preceding year.

INLAND FISHERIES.

More pickerel, but rather fewer trout, were taken in the inland waters of New Brunswick. There was a decrease of 50 per cent in the catch of eels.

There was little difference in the production of fish in the inland waters of Quebec, except that the catch of eels was about 40 per cent less.

A smaller quantity of whitefish and pickerel was taken from Ontario waters, but the catch of herring was much greater.

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There was an increased production of all the chief kinds in the waters of Manitoba. The summer catch of whitefish in lake Winnipeg was very good. The fish were of a good size, and fishermen did well. Winter fishing in the northern lakes was not quite so good, owing to the fact that a period of mild weather made the ice unsuitable for operations until the beginning of December.

In Saskatchewan there was an increase of 34 per cent in the catch of whitefish; of 10 per cent in the catch of pike; and 20 per cent in that of pickerel.

In Alberta, whitefish gave an increase of 28 per cent; pike an increase of 34 per cent; and pickerel an increase of 40 per cent.

It is reported that the smaller lakes in the provinces of Saskatchewan and Alberta appear to be as well stocked as ever, despite the fact that settlers are turning their attention more and more to the catching of fish, not only to provide a substitute for animal food in their diet, but to use it as an article of commerce as well.

In the Yukon Territory the catch of whitefish, trout, and grayling fell short of the preceding year's yield. Two lakes in the Stewart district were opened up to commercial fishing, and the returns indicate that the future catch of pike and pickerel may be of considerable importance.

The salmon run in the Yukon waters was about normal, except in the Porcupine river, where for some reason it failed. The total catch was, therefore, slightly less.

The following table shows the comparative quantities of the principal kinds of fresh-water fish taken in all the inland waters of Canada in the last five years:

		1917.	1916-17.	1915-16.	1914-15.	1913-14.
Whitefish.....	cwt.	178,838	164,992	153,529	159,894	137,887
Lake Herring.....	"	206,786	110,055	117,370	92,307	131,614
Trout.....	"	70,672	85,622	111,361	63,340	68,491
Pickerel.....	"	86,425	105,428	55,722	97,555	61,603
Pike.....	"	79,383	73,993	69,229	97,724	64,925

PACIFIC FISHERIES.

Salmon.

In point of value the salmon fishery of British Columbia is by far our most important fishery. Its value in 1917 represented about 77 per cent of the value of all the fisheries products of that province, and about 32 per cent of the total value of the fisheries products of the whole of Canada.

The usual fourth-year big run of sockeye salmon in the Fraser River district, which was expected in 1917, did not materialize. Consequently, the pack of that particular grade on the Fraser was not more than 18 per cent of an ordinary big year. This great decrease is clearly attributable to the rock slide at Hell's Gate canyon in 1913, due to the blasting operations connected with the construction of the Canadian Northern Railway along the left bank of the river, which prevented a sufficient number of fish from reaching the spawning beds to produce a big run in 1917.

Notwithstanding this failure, however, the total pack of salmon throughout the province was a record one. Other grades which, prior to the outbreak of war, were practically neglected by packers, are now keenly sought after and packed in ever greater quantities. Of the total catch of all kinds, 82 per cent was canned; 15 per cent consumed fresh or frozen; while the balance was marketed in a mild-cured, dry-salted, and smoked condition.

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The extent to which the canning of the cheaper grades has developed in recent years will be gathered from the following table, which gives the annual pack of each class for the last five years:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
	cases.	cases.	cases.	cases.	cases.
Sockeye.....	339,848	214,780	476,042	536,696	972,178
Red Spring.....	48,630	51,231	51,734	32,908	37,433
White Spring.....	27,646	15,495	6,370	16,420	3,616
Chums.....	475,273	240,201	82,000	184,474	77,965
Pinks.....	496,759	280,644	367,352	220,340	192,887
Cohoos.....	157,589	183,623	146,956	120,201	69,822
Blue Backs and Steelhead.....	11,740	9,082	2,927		
Total Pack.....	1,557,485	995,065	1,133,381	1,111,039	1,353,901

The capture of salmon by means of trolling is developing fast in all the coastal waters of the province. Many fishermen are giving up gill-net fishing and adopting this method. The cost of outfitting for trolling is less than for gill netting, and the fisherman is usually left with larger net earnings at the end of the season.

Halibut.

The halibut fishery is carried on almost entirely in the northern waters of the province. For a number of years there has been a steady diminution in the quantity taken. The landings in 1917 were less than those in the preceding year, but it has to be noted that the drop is only about 8 per cent against a 37 per cent drop from 1915 to 1916. From the beginning of the year the price gradually rose until in October it reached 18½ cents per pound to the fishermen. It fell again to 15 cents toward the end of the year. There was a shortage of bait as usual during the summer months, due not so much to scarcity of bait fish as to the disinclination to fit out and go farther to sea after them at that season of the year.

Herring.

The production of herring was slightly less than in the preceding year, but its value was greater. A somewhat smaller quantity was dry salted for the cheaper markets of the Orient, while more than usual was canned and cured in the Scotch style, for which high prices were secured. Of the total catch, 12 per cent was used as bait; 56 per cent was dry salted; and 32 per cent consumed fresh, canned, smoked, and pickled. Not more than 27 per cent of the total herring value was contributed by the dry-salted fish, however; while no less than 68 per cent of the value was accounted for by fish that were used fresh, canned, smoked, and pickled.

Other Sea Fish.

Black cod are steadily increasing in importance as a food fish. The quantity landed in 1917 was 38 per cent greater than in the preceding year. The bulk of the increase is due to the fact that halibut fishermen now bring in all they take of this fish. It is marketed chiefly in a fresh or smoked condition. The total catch of flatfishes of various kinds was greater by more than 120 per cent.

These are of excellent quality, and as they become better known to the consuming public will certainly be used in ever greater quantities. Pilchards appear in our returns for the first time. A total of 1,363 cwts. was landed on the west coast of Vancouver island, from which there were canned 1,090 cases

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(of 48 lbs. each) and 200 barrels cured in salt. The catch of smelts, skate, and rock cod amounted in the aggregate to 3,883 against 2,620 cwts. in the preceding year.

Shellfish.

The oyster fishery yielded 1,789 barrels, which represents an increase of about 15 per cent. Unlike the oyster fishery on the Atlantic coast, the British Columbia one seems to be increasing from year to year recently. The catch of clams amounted to 11,998 barrels. This is an increase of 40 per cent over the catch in the preceding year. Half the catch was used fresh, while the other half was canned. There were no less than 5,886 cwts. of edible crabs landed, which amounted in value to \$48,424. The catch of 1917 was nearly 80 per cent greater than that of 1916.

Whales and Seals.

There were three whaling stations in operation on the Pacific coast, and the number of whales caught was 379. In the preceding year the catch was 403. The number of fur seals taken by the Indians along the coast amounted to 218 against 159 in the preceding year.

In the following table will be seen the quantities of the chief kinds of fish landed in British Columbia in the last five years:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
Salmon..... cwt.	1,601,520	1,196,432	1,369,394	1,369,740	1,509,354
Herring..... "	487,241	496,030	467,452	563,406	649,062
Halibut..... "	113,529	123,062	194,896	214,444	223,465
Flatfishes, other..... "	15,632	7,013	4,575	6,642	2,180
Black Cod..... "	87,532	63,371	35,870	47,161	29,220

The relative total value of Atlantic, Pacific, and inland fisheries in the last five years is shown in the table which follows:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
	\$	\$	\$	\$	\$
Atlantic.....	25,494,010	19,748,667	16,703,182	15,683,171	15,581,413
Pacific.....	21,518,595	14,637,346	14,538,320	11,515,086	13,891,398
Inland.....	5,299,439	4,822,365	4,619,206	4,066,374	3,734,937
Grand totals.....	52,312,044	39,208,378	35,860,708	31,264,631	33,207,748

In comparing the value produced in one division with that in another of the three divisions in the foregoing table it should be kept in mind that during 1917, for example there were 63,128 persons engaged in the fisheries of the Atlantic, 20,883 in those of the Pacific, and 11,111 in those of the inland waters.

Appended to this report are tables showing the quantity and value of each kind of fish, and the number and value of vessels, gear, etc., for the whole of Canada; also the quantity and value of each kind of fish, and the number and value of vessels, etc., by provinces.

Gasoline engines are being utilized more and more by fishermen on both the Atlantic and Pacific coasts to enable them to get speedily to and from the

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fishing grounds. In 1917 there were 14,823 boats with such engines in use against 12,828 in the preceding year.

The use of steam trawlers on the Atlantic coast in recent years has immensely stimulated the trade in fresh fish, by the regularity with which they land supplies. These vessels operate all through the winter as well as summer, and their trips to and from the fishing grounds can be exactly timed to suit the requirements of the trade. In view of the continued great demand for all kinds of Canadian fish at home, in the United States, and overseas, and of the preparations made for a vigorous prosecution of the fisheries on river, lake, and ocean during 1918, I look with confidence for another substantial increase in the value of our fisheries.

CONCLUDING REMARKS.

In concluding this report I desire to say that both the Inside and the Outside Service of the Fisheries Branch are strongly represented at the front. At the outbreak of the war there were six officials in the Inside Service of the branch who were eligible for military service. Of these, five enlisted.

It is with the deepest regret that I chronicle the death of one of these,—Lieutenant B. W. Harmon, M.C., D.C.M., etc. Lieutenant Harmon was a young man of exceptional ability and high ideals. He had a deep sense of responsibility and most earnestly devoted himself to his Departmental duties. Had he lived he was destined to take an important part in the fisheries administration of this country.

At the outbreak of the war he was engaged on a special mission to the Pribilof islands—the United States fur seal group—in Alaska. At the first opportunity after learning that war was declared, he left for Ottawa to seek leave of absence and enlist. He went across with the first contingent as a private. He was promoted on the field to corporal and then to lieutenant. He was awarded the Distinguished Conduct Medal for conspicuous gallantry and devotion at Givenchy in June, 1915. Shortly afterwards he was awarded the Cross of St. George of Russia, and early in 1917 he was given the Military Cross, the official order stating that “he led a raiding party, bombed three dug-outs, inflicting many casualties, and brought back two unwounded prisoners.” Later on he joined the Flying Service in which he met his death while attacking, single-handed, eight enemy machines.

While all those who have gone overseas are performing gallant services, the work of Major Raymond Collishaw of the British Columbia Fisheries Patrol service has been so outstanding that special mention of it herein can involve no unfairness to any other. Mr. Collishaw entered the Flying Service in the early stages of the war. He was rapidly promoted until now he is a squadron commander, with the rank of major. Full information as to his achievements is not yet before me, but it is known that he has received at least five decorations, amongst them being the D.S.O. with bar, the D.S.C., and the Croix de Guerre, with palms. He has over fifty enemy planes to his credit. So far he has not been wounded.

Major J. A. Motherwell, chief clerk in the office of the chief inspector for British Columbia, after rendering conspicuous services was very severely wounded in action in France during the latter portion of the year, and was still in the hospital at the end of the year.

The work of the Fisheries Branch has been extremely heavy throughout the year, but it affords me pleasure to state that by continuous devotion to their duties on the part of both the officers and clerks it has been efficiently performed.

I am, sir, your obedient servant,

G. J. DESBARATS,

Deputy Minister of the Naval Service.

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TABLE 1.—RECAPITULATION of the Quantities and Values of all Fish caught and landed in a Green State, and of the Quantities and Values of all Fish and Fish Products Marketed in a Fresh, Dried, Pickled, Canned, etc. State, for the **Whole of Canada**, during the year 1917.

Kinds of Fish.	Sea Fisheries.*				Inland Fisheries.		Both Fisheries.		Total Marketed Value.
	Caught and landed		Marketed		Caught and Marketed		Marketed		
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$		\$	
Salmon..... cwt.	1,640,476	10,121,003							
“ used fresh..... cwt.			297,920	3,074,196	2,294	36,238	300,214	3,110,434	
“ canned..... cases			1,557,921	14,021,244			1,557,921	14,021,244	
“ smoked..... cwt.			1,617	28,197			1,617	28,197	
“ dry-salted..... cwt.			14,270	139,211			14,270	139,211	
“ mild-cured..... cwt.			8,611	111,943			8,611	111,943	17,411,029
Lobsters..... “	474,871	3,284,508							
“ canned..... cases			195,993	3,931,866			195,993	3,931,866	
“ shipped in shel cwt.			84,569	1,722,399			84,569	1,722,399	5,654,265
Cod..... “	2,215,455	5,993,977							
“ used fresh..... “			180,187	1,000,197			180,187	1,000,197	
“ green-salted..... “			287,784	1,683,745			287,784	1,683,745	
“ smoked filets..... “			5,264	72,865			5,264	72,865	
“ dried..... “			481,613	4,645,709			481,613	4,645,709	7,402,516
Black Cod..... “	87,532	494,209							
“ used fresh..... “			73,164	743,229			73,164	743,229	
“ smoked..... “			6,786	131,709			6,786	131,709	
“ green-salted..... “			386	4,338			386	4,338	
“ dried..... “			8	128			8	128	879,404
Haddock..... “	712,416	1,610,248							
“ used fresh..... “			221,807	1,159,359			221,807	1,159,359	
“ canned..... cases			13,137	84,522			13,137	84,522	
“ smoked (fin-nans)..... cwt.			41,382	598,939			41,382	598,939	
“ green-salted..... “			70,496	419,273			70,496	419,273	
“ dried..... “			81,750	674,626			81,750	674,626	2,936,719
Hake and cusk..... “	321,605	619,007							
“ used fresh..... “			25,795	93,585			25,795	93,585	
“ green-salted..... “			6,873	40,115			6,873	40,115	
“ smoked filets..... “			5,314	64,026			5,314	64,026	
“ dried..... “			88,961	692,164			88,961	692,164	
“ smoked..... “			25	375			25	375	890,265
Pollock..... “	189,908	360,070							
“ used fresh..... “			26,444	58,471			26,444	58,471	
“ green-salted..... “			5,142	25,434			5,142	25,434	
“ smoked filets..... “			2,266	25,213			2,266	25,213	
“ dried..... “			48,795	377,077			48,795	377,077	486,195
Herring..... “	1,274,922	1,578,647							
“ used fresh..... “			207,432	541,126	205,805	1,003,018	413,237	1,544,144	
“ canned..... cases			58,455	372,126			58,455	372,126	
“ smoked..... cwt.			55,651	311,624			55,651	311,624	
“ dry-salted..... cwt.			161,865	328,721			161,865	328,721	
“ pickled..... brl.			86,859	753,789	327	1,962	87,186	755,751	
“ used as bait..... “			145,378	342,672			145,378	342,672	
“ used as fertilizer..... “			50,338	38,650			50,338	38,650	3,693,688
Mackerel..... cwt.	167,067	967,333							
“ used fresh..... “			75,831	701,783			75,831	701,783	
“ canned..... cases			75	600			75	600	
“ salted..... brl.			30,394	630,971			30,394	630,971	1,333,354
Shad..... cwt.	5,707	41,636							
“ used fresh..... “			4,942	39,686	1,047	7,769	5,989	47,455	
“ salted..... brl.			255	3,486	94	1,309	349	4,795	52,250
Alewives..... cwt.	91,831	130,919							
“ used fresh..... “			24,723	50,419	1,427	4,281	26,150	54,700	
“ salted..... brl.			22,369	134,254	1,673	7,528	24,042	142,782	196,482
Sardines..... “	274,359	1,028,391							
“ canned..... cases			168,365	1,009,305			168,365	1,009,305	
“ sold fresh or salted..... brl.			240,420	901,400			240,420	901,400	1,910,705
Halibut..... cwt.	140,024	1,540,377							
“ used fresh..... “			139,780	2,064,123			139,780	2,064,123	
“ smoked..... “			122	2,512			122	2,512	2,066,635

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TABLE 1.—RECAPITULATION.—of the Quantities and Values of all Fish, etc.

Kinds of Fish.	Sea Fisheries.				Inland Fisheries.		Both Fisheries.		Total Marketed Value.
	Caught and landed.		Marketed.		Caught and Marketed		Marketed.		
	Quantity	Value.	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$		\$	\$
Soles..... cwt.	8,244	28,493	8,244	81,109			8,244		81,109
Flounders..... "	10,659	24,241	10,659	55,995			10,659		55,995
Skate..... "	5,044	8,174	5,044	20,883			5,044		20,883
Smelts..... "	73,153	718,137	73,133	1,027,545			73,133	1,027,545	
" used as bait..... "			20	10			20	10	1,027,555
Oulachons..... "	1,231	4,836	1,231	10,991			1,231		10,991
Brill..... "	5,142	15,426	5,142	51,420			5,142		51,420
Tom Cod..... "	13,168	25,920	13,168	38,893			13,168		38,893
Octopus..... "	184	1,388	184	1,656			184		1,656
Rock Cod..... "	1,086	3,900	1,086	8,688			1,086		8,688
Pilchards..... "	1,363	2,726							
" salted..... brl.			200	2,000			200	2,000	
" canned..... cases			1,090	9,810			1,090	9,810	11,810
Whiting..... cwt.	545	1,722							
" used fresh..... "			345	1,725			345	1,725	
" smoked..... "			100	1,000			100	1,000	2,725
Grayfish (exported fresh)..... "	11,712	4,673	11,200	4,480			11,200	4,480	
" canned..... cases			289	1,300			289	1,300	5,780
Swordfish..... cwt.	4,338	22,590	4,338	33,178			4,338		33,178
Albacore..... "	15,657	52,843							
" used fresh..... "			15,521	81,451			15,521	81,451	
" canned..... cases			85	510			85	510	81,961
Oysters..... brl.	13,632	102,593	13,632	109,265			13,632		109,265
Clams & Quahaugs..... "	55,655	101,794							
Clams & Quahaugs, use fresh..... "			35,840	93,710			35,840	93,710	
Clams & Quahaugs used as bait..... "			360	720			360	720	
Clams & Quahaugs canned..... cases			19,445	128,535			19,445	128,535	222,965
Dulse, Crabs, Cockles, etc..... cwt.	19,540	53,290	9,601	66,918			9,601		66,918
Scallops..... brl.	6,600	26,800	100	800			100	800	
" shelled..... gal.			13,000	26,000			13,000	26,000	26,800
Squid..... brl.	7,339	23,975	7,339	29,751			7,339		29,751
Caplin..... "	27,769	41,407	27,769	41,449			27,769		41,449
Trout..... cwt.	2,990	32,188	2,990	45,183	70,672	654,767	75,662		699,950
Sturgeon..... "	466	5,709	466	10,045	5,439	87,966	5,905		98,011
Bas..... "	1,437	16,060	1,437	20,335	383	4,147	1,820		24,482
Eels..... "	3,973	23,455	3,973	30,647	7,656	59,810	11,634		90,457
Whitefish..... "					178,838	1,248,006	178,838		1,248,006
Pickarel..... "					86,425	650,632	86,425		650,632
Perch..... "	492	3,154	492	4,920	24,215	121,803	24,707		126,723
Pike..... "					79,383	429,396	79,383		429,396
Tullibee..... "					64,910	333,686	64,910		333,686
Maskinonge..... "					319	3,188	319		3,188
Catfish..... "					4,850	38,210	4,850		38,210
Goldeyes..... "					8,131	40,209	8,131		40,209
Carp..... "					16,695	40,890	16,695		40,890
Mullets..... "					11,013	22,026	11,013		22,026
Mixed Fish..... "	7,446	12,694	7,446	24,049	134,680	481,493	142,126		505,542
Tongues and Sounds..... "			3,650	84,635			3,650		84,635
Caviare..... lb.					11,831	15,106	11,831		15,106
Sturgeon Bladders..... No.					1,628	977	1,628		977
Salmon roe..... cwt.			1,564	7,820			1,564		7,820
Hair seals..... No.	31,145	43,320							
" skins..... "			31,145	71,690			31,145		71,690
Fur Seals..... "	218	2,180							
" skins..... "			218	6,540			218		6,540
Belugas..... "	91	682							
" skins..... "			91	682			91		682
Whales..... "	380	195,700							
Whale Bone and Meal..... tons.			291	10,185			291		10,185
Fertilizer..... "			1,267	71,889	2,250		3,517		72,811
Whale Oil..... gal.			437,245	342,422			437,245		342,422
Fish Oil..... "			582,943	397,164			582,943		397,164
Seal Oil..... "			84,927	83,937			84,927		83,937
Porpoises..... No.					82	4,100	82		4,100
Silver Hake..... cwt.	140	56	140	56			140		56
Witches..... "	5	15	5	50			5		50
Sea Weed..... tons.			550	550			550		550
Tomalley..... cases			253	5,060			253		5,060
Fish Offal..... tons.			150	300			150		300
Glue..... gal.			900	450			900		450
Gill Bone..... cwt.			510	12,802			510		12,802
Totals.....		29,370,516		47,012,605		5,299,439			52,312,044

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TABLE 2.—RECAPITULATION of the Number of Fishermen, etc., and of the Number and Value of Fishing Vessels, Boats, Nets, Traps, etc., used in the Sea and Inland Fisheries of the **Whole of Canada** for the year 1917.

	Sea Fisheries.		Inland Fisheries.		Both Fisheries.	
	Number.	Value.	Number.	Value.	Number.	Value.
		\$		\$		\$
Steam fishing vessels (tonnage 2,413)....	44	1,010,943	131	742,100	175	1,753,043
Sailing and gasoline vessels.....	1,358	4,143,118			1,358	4,143,118
Boats (sail and row).....	22,780	1,011,979	4,564	130,841	27,344	1,142,820
Gasolene boats.....	13,933	4,257,521	890	363,223	14,823	4,620,744
Carrying smacks.....	522	372,785			522	372,785
Gill-nets, seines, trap and smelt nets, etc.	162,271	3,891,023		1,456,474		5,347,497
Weirs.....	734	745,765	305	44,385	1,039	790,150
Trawls.....	22,517	353,633			22,517	353,633
Spears.....			247	766	247	766
Skates of gear.....	6,828	86,440			6,828	86,440
Hand lines.....	72,681	89,790	4,054	4,888	76,735	94,678
Eel traps.....			74	198	74	198
Crab traps.....	1,140	5,700			1,140	5,700
Lobster traps.....	1,497,179	1,871,701			1,497,179	1,871,701
Lobster canneries.....	610	1,765,725			610	1,765,725
Salmon canneries.....	89	6,528,743			89	6,528,743
Oil factory.....	1				1	
Clam canneries.....	12	251,832			12	251,832
Sardine canneries.....	2				2	
Halibut dories.....	69	6,900			69	6,900
Salmon traps.....	2	10,000			2	10,000
Freezers and ice-houses.....	873	3,021,980	2,019	272,756	2,892	3,294,736
Fishing piers and wharves.....	2,808	2,357,484	273	75,269	3,081	2,432,753
Whaling stations.....	4	170,855			4	170,855
Pile drivers and seine reels.....	451	33,350			451	33,350
Fish wheels.....			3	355	3	355
Crab establishments.....	2	1,200			2	1,200
Oyster establishment.....	1	15,450			1	15,450
Salteries.....	3	12,000			3	12,000
Smoke and fish-houses.....	9,544	2,046,671	216	15,485	9,760	2,062,156
Totals.....		34,062,588		3,106,740		37,169,328

PERSONS EMPLOYED.

	Sea Fisheries	Inland Fisheries	Both Fisheries.
Number of men employed on vessels.....	7,431	755	8,186
“ “ boats.....	53,491	9,209	62,700
“ “ carrying smacks.....	760		760
Number of persons employed in fish-houses, freezers, canneries, etc.....	22,329	403	22,732
Number of men fishing (not in boats).....		744	744
Totals.....	84,011	11,111	95,122

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TABLE 3.—RECAPITULATION by Provinces, of the Quantities and Values of all Fish and Fish Products Marketed during the year 1917.

Kinds of Fish.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Ontario.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1 Salmon, used fresh.....	9,604	\$ 190,138	15,983	\$ 242,950	65	\$ 780	11,110	\$ 105,517		\$
2 " canned.....	346	3,114					90	765		
3 " smoked.....	199	4,975								
4 " dry-salted.....	36	750					1,564	12,512		
5 " mild-cured.....										
6 Lobsters, canned.....	78,426	1,582,310	43,549	870,980	62,000	1,240,000	12,018	238,576		
7 " shipped in shell.....	64,096	1,488,861	19,063	224,494	112	1,456	758	7,588		
8 Cod, used fresh.....	151,346	903,352	13,254	49,362	3,688	15,442	11,899	32,041		
9 " green-salted.....	81,063	545,492	20,961	123,888	24,382	184,072	161,378	830,293		
10 " smoked fillets.....	5,264	72,865								
11 " dried.....	299,654	3,031,825	34,630	346,300	6,124	61,240	141,205	1,206,344		
12 Black cod, used fresh.....										
13 " green-salted.....										
14 " smoked.....										
15 " dried.....										
16 Haddock, used fresh.....	216,230	1,141,128	5,259	15,777	300	2,400	18	54		
17 " canned.....	10,287	61,722	2,850	22,800						
18 " smoked.....	41,382	598,939								
19 " green-salted.....	70,066	417,705	75	325			355	1,243		
20 " dried.....	78,024	646,726	2,035	15,520	613	5,912	1,078	6,468		
21 Hake and cusk, used fresh.....	24,839	90,102	157	527	291	1,164	365	1,277		
22 " " smoked.....										
23 " " green-salted.....	803	3,695			6,070	36,420				
24 " " smoked.....	4,646	58,682	668	5,344						
25 " " dried.....	60,015	506,289	25,600	159,456	3,146	25,219	200	1,200		
26 Pollock, used fresh.....	8,955	23,492	17,489	34,978						
27 " green-salted.....	5,142	25,434								
28 " smoked fillets.....	2,266	25,213								
29 " dried.....	32,804	265,140	15,991	111,937						
30 Herring, used fresh.....	35,110	94,561	9,485	25,662	2,758	5,582	76,930	84,191	201,801	992,909
31 " canned.....	7,263	36,315	4,542	31,794						
32 " smoked.....	10,354	60,997	32,030	193,590			7,004	28,012		
33 " dry-salted.....										
34 " pickled.....	58,453	499,201	7,491	61,248	975	6,825	12,974	70,649		
35 " used as bait.....	51,750	150,146	29,932	66,979	8,486	25,458	26,425	28,265		
36 " " fertilizer.....		184	20,221	27,241			30,025	11,225		

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TABLE 3.—RECAPITULATION by Provinces, of the Quantities and Values of all Fish, etc.—*Con.*

Kinds of Fish.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Ontario.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
37 Mackerel, used fresh.....	56,224	470,352	18,806	225,672	737	5,425	64	334		\$
38 " " canned.....	75									
39 " " salted.....	23,150	502,372	183	2,745	1,009	17,130	6,052	108,724		
40 Shad, used fresh.....	1,123	9,341	4,569	35,557			286	2,242		
41 " " salted.....	170	2,076	104	2,359						
42 Alewives, used fresh.....	6,104	11,812	20,046	42,888	100	500				
43 " " salted.....	2,809	18,329	21,133	122,953						
44 Sardines, canned.....	295	885	168,070	1,008,420			56	448		
45 " " sold fresh or salted.....	236	472	240,128	1,900,480			1,515	7,728		
46 Halibut, used fresh.....	24,877	336,820	103	1,075						
47 " " smoked.....										
48 Soles.....	438	2,400								
49 Flounders.....	4,401	20,745	3,837	9,127			442	2,522		
50 Skate.....	3,387	10,734	24	32						
51 Smelts.....	7,964	106,146	55,703	834,415	6,401	53,984	1,921	18,740		
52 Oulachons.....										
53 Brill.....	338	478	12,565	37,695	95	210	170	510		
54 Tom-cod.....										
55 Octopus.....										
56 Rock cod, etc.....										
57 Pilchards, salted.....										
58 " " canned.....										
59 Whiting, used fresh.....										
60 " " smoked.....										
61 Gray fish, used fresh.....	289	1,300								
62 " " canned.....	4,338	33,178								
63 Swordfish.....	15,521	81,451								
64 Albacore, used fresh.....	85	510								
65 " " canned.....										
66 Oysters.....	1,879	13,300	6,926	41,556	3,038	22,207				
67 Clams and quahaugs, used fresh.....	13,122	28,112	15,070	24,984	670	2,080	1,346	3,302		
68 " " canned.....	168	883	12,842	77,052	425	2,550	4	32		
69 Dulse, crabs, cockles, etc.....	2,810	13,605	905	4,889						
70 Scallops, shelled.....	13,000	26,000								
71 " " in shell.....			100	800						
72 Squid.....	4,852	23,733	407	1,628			2,080	4,390		
73 Caplin.....							27,769	41,449		
74 Trout.....	1,056	17,225	1,329	18,386	475	3,990	1,786	18,073	62,829	592,433

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75 Sturgeon...	cwt.	204	1,840	46	690	1,408	15,977	1,325	19,874	75
76 Bass...	"	2,234	14,794	1,271	19,065	345	3,577			76
77 Eels...	"			1,348	12,992	750	51,782	1,689	10,139	77
78 Whitefish...	"			56	840		31,310	49,498	474,602	78
79 Pickerel...	"			247	2,470		2,111	25,216	252,232	79
80 Perch...	"			10	40		2,787	15,170	75,853	80
81 Pike...	"						30,079	10,139	60,835	81
82 Tullibee...	"						2,858	4,420	35,360	82
83 Maskinonge...	"						250			83
84 Catfish...	"									84
85 Goldeyes...	"									85
86 Carp...	"									86
87 Mulllets...	"									87
88 Mixed fish...	"	4,011	7,267	1,322	1,838	2,500	12,500	14,195	28,390	88
89 Tongues and Sounds...	"	636	12,987	529	15,745	11,597	86,916	38,484	192,419	89
90 Caviare...	lb.			100	150	425	5,608	5,806	5,806	90
91 Sturgeon bladders...	No.						900	1,628	977	91
92 Salmon roe...	cwt.									92
93 Hair seal skins...	No.	3,152	4,271	5	15	27,988	67,404			93
94 Fur seal skins...	"									94
95 Beluga skins...	"									95
96 Bone meal...	tons.						682			96
97 Fertilizer...	"	47					922			97
98 Whale oil...	gal.			250	175					98
99 Fish oil...	"			86,090	65,342		144,158			99
100 Seal oil...	"	270,058	148,673		5		75,743			100
101 Fish, offal...	tons.	9,178	18,188							101
102 Glue...	gal.	3,150	300							102
103 Tomalley...	cases,	900	450							103
104 Porpoises...	No.	253	5,060				4,100			104
105 Sea weed...	tons.									105
106 Witches...	cwt.	580	550							106
107 Gill bone...	"									107
108 Silver hake...	"			140	56					108
Totals			14,408,319		6,143,088		1,786,310		2,866,419	

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[illegible]

TABLE 3.—RECAPITULATION by Provinces, of the Quantities and Values of all Fish, etc.—*Con.*

Kinds of Fish.	Manitoba.		Saskatchewan.		Alberta.		Yukon.		British Columbia.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
88 Mixed fish.....	224,482	\$	13,870	\$	43,851	\$	886	\$		\$
89 Tongues and sounds.....	74,640	158,750	8,372	22,638	1,177	3,335	755	19,075	1,648	13,184
90 Caviare.....	5,560	8,250								
91 Sturgeon bladders.....										
92 Salmon roe.....										
93 Hair seal skins.....									1,564	7,820
94 Fur seal skins.....									218	6,540
95 Beluga skins.....										
96 Bone meal.....									291	10,185
97 Fertilizer.....									1,220	70,164
98 Whale oil.....									436,995	342,247
99 Fish oil.....									44,820	23,892
100 Seal oil.....										
101 Fish offal.....										
102 Glue.....										
103 Tomalley.....										
104 Porpoises.....										
105 Sea weed.....										
106 Witches.....									5	50
107 Gill bone.....									510	12,802
108 Silver hake.....										
Totals.....	304,477	1,543,288	73,172	320,238	45,028	184,009	1,441	67,400		21,518,595

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TABLE 4.—RECAPITULATION by Provinces of the Number and Value of Fishing Implements, vessels, boats, etc., used in the Fishing Industry of Canada during the year 1917, and the number of Persons employed.

Province.	Persons employed.			Vessels tugs and carrying smacks.		Boats.		Value of seines, trap and smelt nets, etc.	Value of hand lines weirs, trawls, etc.	Value of lobster plant, etc.	Approximate value of salmon and other fish-houses, freezers, and fixtures.	Total value.				
	Number in vessels etc.	Number in boats.	Number in canneries, fish-houses, etc.	Number	Value.	Gasolene.	Sail and row.						Total value.			
Nova Scotia.....	4,814	16,953	4,790	805	2,499,010	\$	5,219	7,793	1,481,625	\$	863,607	354,416	1,649,510	\$	2,847,650	9,695,818
New Brunswick.....	1,656	14,070	5,304	552	489,530		2,194	8,843	942,845		772,896	742,106	737,301		1,175,137	4,859,815
Prince Edward Isl d.....	52	3,398	2,438	22	9,700		1,812	405	346,050		76,015	22,030	757,230		349,637	1,560,682
Quebec.....	80	9,577	2,064	31	27,805		1,652	3,693	718,538		395,309	99,235	493,385		554,452	2,288,724
Ontario.....	635	3,070		120	601,100		702	1,108	343,164		1,147,692	3,988			235,238	2,331,182
Manitoba.....	120	2,072	182	11	141,000		7	1,062	53,323		166,713	100			101,420	462,556
Saskatchewan.....		1,661					11	540	782		56,407	141			3,250	72,580
Alberta.....		1,032	30				54	378	31,102		36,518	30			10,830	78,480
Yukon Territory.....		233	8					112	3,215		3,225	493			5,500	12,433
British Columbia.....	1,589	11,378	7,916	514	2,500,801		3,172	3,548	1,887,890		1,829,115	119,381			9,519,941	15,807,058
Totals.....	8,946	63,444	22,732	2,055	6,268,946	\$	14,823	27,413	5,770,404	\$	5,347,497	1,341,920	3,637,426		14,803,075	

Grand Total Value..... \$37,169,328

FIFTY-SECOND
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of the Naval Service

FOR THE YEAR

1918

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1920

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc., etc.,
Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-second annual report of the Fisheries Branch of the Department of the Naval Service.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

Minister of the Naval Service.

DEPARTMENT OF THE NAVAL SERVICE,

OTTAWA, November, 1919.

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DEPUTY MINISTER'S REPORT.

To the Hon. C. C. BALLANTYNE,
Minister of the Naval Service.

SIR,—I have the honour to submit the fifty-second annual report of the Fisheries Branch of the Department of the Naval Service, which deals with:—

- (a) International Questions;
- (b) The various activities of the Branch;
- (c) The fishing operations of the year 1918.

INTERNATIONAL FISHERY QUESTIONS.

FISHERIES COMMISSION.

The status of these questions was explained in my report for last year.

The International Commission, which was appointed last year to consider a settlement of outstanding fishery questions between Canada and the United States, completed its work during the past summer and submitted a joint report, dated September 6, to the respective Governments. While the report will be regarded as confidential until it is made public by the two Governments, it is understood that the Commission reached unanimous findings on all the matters referred to it.

Pending action by the two Governments on the report of the Commission it is anticipated that the arrangement for reciprocal privileges to the fishing vessels of either country in the ports of the other, that were adopted last year on the recommendations of the different sections of the Commission to their respective Governments, and which were fully explained in my last report, will remain effective. It is giving eminent satisfaction to practically all concerned on both the Atlantic and Pacific coasts. It has not only removed the irritating conditions that have been causing friction between the two countries for more than a hundred years, but it has facilitated the production of fish and the free movement thereof to all parts of this continent.

FUR SEAL FISHERY.

The good effects of the Pelagic Sealing Treaty of 1911 on the north Pacific seal herds are becoming strikingly evident. It will be remembered that when this treaty was entered into the seal-herds were on the verge of commercial exhaustion.

Under the treaty, Canada receives 15 per cent of the skins taken on the United States islands, 15 per cent of those taken on the Russian islands, and 10 per cent of those secured on the Japanese islands.

During the season 1918, 34,890 skins were taken on the United States islands and 550 on the Japanese islands. The latter islands are quite small. At the present time the only one on which seals are killed is Robin island, which was ceded by Russia to Japan following the close of the Russo-Japanese war. In the present unsettled conditions in Russia it has not been possible to ascertain how many seals, if any, were killed on the Russian islands during the year.

It will be remembered that in 1912, the first year that the treaty was effective, both the United States and Russia enacted a close season for five years, so that killing seals on the islands did not begin until 1917.

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Under the treaty Canada's share of the skins are to be handed over at the seal islands. This is an expensive method, as it involves sending a vessel to the islands each year. Also it is scarcely possible in practice to be sure that the skins that would be taken over there would be of average value. In the circumstances an arrangement has been entered into with the United States Government for the disposal of Canada's share of skins, which is eminently satisfactory to this country.

The United States Government conveys all the skins taken from the islands to market. They are all dressed and dyed and are sold at public auction, and the United States Government accounts to Canada for 15 per cent of the net proceeds.

The skins taken in 1918 have not yet been sold, but as they are in great demand and the prices are high it is anticipated that Canada's share will more than recoup the advance payments of \$200,000 plus \$10,000 per year during each year of the close season, made by the United States Government.

Keeping in view the rapidity with which the seal herds are increasing in number year by year, there is every reason to expect that the herds will speedily be brought back to a maximum of productivity, so that in the course of years an annual take of well over 100,000 seals may reasonably be expected.

DEPARTMENTAL ACTIVITIES.

CAMPAIGN FOR GREATER PROTECTION OF LOBSTER FISHERY.

While Canada has still a wonderful lobster fishery—by far the most important in the world—there is no question that it has seriously declined on account of over-fishing, notwithstanding highly protective regulations that have ever been growing in stringency. Minimum size limits have been tried, but the majority of the lobsters have for years been so small on the portions of the coast where they are mostly canned, that the industry could not go on if any reasonable size limit from a protective standpoint were enforced. From time to time the fishing seasons have been shortened. The taking of egg-bearing lobsters at any time excepting for hatchery purposes is illegal. Lobster hatching on an extensive scale was also tried, but it proved absolutely ineffective in building up the fishery, and it has been decided to discontinue hatching under present methods.

The fact is that the lobster fishery is a peculiarly difficult one to protect. For instance, one of the most important requirements is the prohibition of the retaining of any egg-bearing lobsters that may be found in the fishermen's traps; but with the exercise of care a dishonest fisherman can readily and speedily remove the eggs in such a way as to make it exceedingly difficult to prove that he did so, especially when lobsters are being handled in large numbers as is usually the case at the places where the boats bring their catches ashore. Indeed, it is obvious that if the fishery is to be saved from commercial exhaustion, the department must have the close co-operation of the fishermen and canners to such end, and with such co-operation it can not only be saved, but it can be built up to a maximum of productivity. With this object in view an educational campaign amongst those engaging in the different branches of the industry was undertaken this year. The campaign was placed in charge of Professor A. P. Knight, M.A., M.D., etc., of Queen's University, who for several years past has been engaging in a study of the natural history of the lobster, and whose informative reports thereon have been published by the department year by year. To assist him in this work the following persons were employed: Professor A. Vachon, of Laval University, who was assigned the gulf coast of New Brunswick; Professor H. G. Perry, of Acadia University, to whom was assigned the southern shore of Prince Edward island; Professor W. T. MacClement, of Queen's University, to whom was assigned the southern portion of Northumberland strait; Dr. M. McGillivray, of Kingston, to whom was assigned the southern portion of New Brunswick, and western Nova Scotia; Acting Professor J. T.

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Herbert, of the University of New Brunswick, to whom was assigned Cape Breton island; Mr. Andrew Halkett, naturalist of the department, who had been engaged in assisting Dr. Knight in investigations into the life-history of the lobster for several seasons past continued such work, and also assisted in the campaign in Prince Edward island and at the Magdalen islands.

The campaign started in April, and was mainly confined to May and June. Meetings of the fishermen and canners were held in halls, in the canneries, on the wharves, and indeed wherever a few of them could be collected, at which the natural history of the lobster was gone into in simple language, and discussions on the subject encouraged. The imperative need of each fisherman immediately returning to the water every egg-bearing lobster that he might find in his traps was strongly emphasized, as was also the responsibility of each fisherman and canner to his neighbour engaging in the industry, as apart from other considerations it is eminently unfair to those who zealously endeavour to carry out the full requirements of the law if one of their neighbours fails to do so.

While it is impossible to say in advance what the effects of this campaign will be, there are strong indications that it was highly successful. Apart from the direct information given those interested, probably one of the most important results has been that it has caused a great deal of discussion of the whole question of the natural history of the lobster, and of the means necessary to the proper protection of the industry amongst the fishermen and canners themselves. Such discussions must end in general enlightenment, and no doubt in a keener appreciation of the importance of co-operating with the department in affording the fishery the full measure of protection it requires. The department is so satisfied that this campaign has been the cause of much good that it will be continued during the season of next year.

Moreover, as lobsters are now in the category of luxuries, as a large portion of the canned product has in the past been marketed in Europe; as it was doubtful whether shipping accommodation would be available for the transportation of any lobsters for the overseas trade; as the cost of all fishing equipment and of tin plate, gasoline, etc., had become so high that it seemed doubtful whether a reasonable profit could be made from the industry this year; and as during the war it was urgent that all reasonable efforts should be centered on the production of sea fish that would enter into the food supply of the people generally, it seemed that the time was opportune for undertaking some extraordinary measures of lobster protection. Consequently, on June 5, 1918, a circular letter was sent to each canner, and to a large number of lobster fishermen summarizing the situation, and asking for an expression of view:—

1. As to the wisdom of prohibiting all lobster canning in 1919, and each second year thereafter until the fishery would be restored; and
2. That canning be allowed in June, 1919, so as to enable the using up of cans, etc., that might be on hand, and then prohibited for a period of years.

A large number of replies were received. While the opinions expressed therein differed quite widely as to what should be done, there was a remarkable unanimity of opinion that some effective measures should be taken.

In the circumstances it was considered best to call into conference those directly interested in the different branches of the industry to discuss the whole matter. Such conference was held at Halifax on August 8, 1918. It had been advertised by circular letter from the department, and by posters on all portions of the Atlantic coast. Fishermen and canners had been urged to attend, or those from each locality to delegate some one to represent them. The convention was largely attended, and most portions of the coast were represented, although those engaging in the canning branch of the industry were present in greater number than the fishermen. However, the fishermen from different parts of the coast were capably represented by delegates.

The convention was a satisfactory one. The whole question was discussed from the different angles, Dr. Knight having addressed the conference from the natural

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history standpoint. Resolutions were finally drawn up, and unanimously adopted, recommending in effect that canning be not prohibited any year, but that the fishing season be restricted to two months in the year on practically all portions of the coast, excepting from Halifax harbour to Digby county, inclusive, where the live lobster trade is the main branch of the industry, and where it was recommended that the fishing season should be reduced from five and a half months to three months. The seasons recommended were as follows:—

<i>District.</i>	<i>Fishing Season.</i>
The portion of the Nova Scotia coast from Halifax harbour to Digby county, inclusive.	March 1 to May 31, inclusive.
Halifax harbour to Red point, Cape Breton island.	April 20 to June 20, inclusive.
Red point to Cape North.	May 15 to July 15, inclusive.
Cape North and including the south shore of the St. Lawrence excepting the Magdalen islands and the portion of the Northumberland strait specified in the next paragraph.	May 1 to June 30, inclusive.
The portion of Northumberland strait between a line drawn from the mouth of river Philip, Nova Scotia, to Victoria harbour, Prince Edward Island, to one drawn from Chock-fish river, New Brunswick, to West point, Prince Edward Island.	August 1 to September 30, inclusive.
Magdalen islands.	No change.

No size limits were recommended for any of these areas.

The other portions of the coast were not considered, as representatives were not present.

Following consideration of these recommendations the lobster fishery regulations were amended accordingly by Order in Council, September 30, 1918, with the following exceptions:—

(a) In the Gulf district from cape North to the south shore of the St. Lawrence, the fishing season was maintained from April 26 to June 26, as the department considered, in the light of all the information before it, that it would be unadvisable to allow fishing there later than June 26.

(b) In Northumberland strait the fishing season was fixed at August 16 to October 15 instead of the months of August and September, as the department's information showed that soft-shell lobsters would be taken if fishing were allowed during the first fortnight in August.

It is hoped that these regulations, that have been decided upon after such full deliberation, will not only be found efficient in enabling the fishery to be adequately protected, but that they will prove reasonably satisfactory to those engaging in the industry.

Also, it was obvious that the conference was a fitting conclusion of the educational campaign and that consequently the department will in future have a greater measure of co-operation from the cannery and fishermen in protecting the lobster fishery than it has experienced in the past.

Close investigations into the natural history of the lobster, and feasible methods of increasing the number thereof, will be continued.

TRANSPORTATION OF FRESH FISH.

One of the greatest, if not the greatest, of the problems facing the development of the demand for fish in this country is that of adequate and cheap transportation facilities. The department has, for years past, been doing everything it feasibly could towards securing such facilities.

Until the business acquires much larger dimensions than at present, express refrigerator car facilities are urgently required, but with the increase in passenger and express traffic the trains from the east have been so loaded, and the need for conserving

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coal on the railways has been so urgent, that at least during the war a regular refrigerator car express service seems impracticable.

Experience has demonstrated beyond question that fresh fish hauled by fast freight in refrigerator cars from the Atlantic coast reach Montreal in very much better condition than if shipped on ice in ordinary express cars. In these circumstances every effort has been made to develop the fast-freight service by refrigerator car into a practical express service.

With the object of making the best arrangements possible for the transportation of fresh fish from the Atlantic coast, the department called into conference representatives of the Canada Food Board, the Canadian National Railways, the Grand Trunk Railway, the Canadian Pacific Railway, the different express companies, and the Canadian Fisheries Association at Montreal on June 20 last.

At the conference it was made quite evident, as above indicated, that a regular refrigerator car express service is, for the present, impracticable, but it was arranged to inaugurate a special refrigerator car service by fast freight to be known as the "Sea Food Special", between Mulgrave and Halifax on the Atlantic coast, and Toronto. This train would move on schedule time as do express trains, and would leave Mulgrave and Halifax on Thursday, Friday, and Saturday of each week, and make the run to Montreal from Mulgrave in forty-seven hours. Shipments for Montreal and Toronto would be included in the same cars, if there was room for such, and on arrival at Montreal the shipments for that place would be removed, when the cars would be handed over to the Grand Trunk Railway, and were scheduled to reach Toronto twenty-four hours later.

As was explained in previous reports this department has, since 1908, been paying one-third of the express charges on shipments of fish from the Atlantic coast to points in Quebec and Ontario. This assistance, with other facilities afforded, has enabled the business to be so expanded that the time is approaching when it can feasibly be withdrawn; and as all the shipments on the days on which the "Sea Food Special" operates should be forwarded by that train, it was decided to withdraw the one-third rebate during such days. The "Sea Food Special" was inaugurated on the 27th of June, and the one-third rebate was discontinued on the 10th of July.

It was further decided that the express rebate should be withdrawn altogether at the end of the present fiscal year, and those interested have been so advised.

The "Sea Food Special" has operated, on the whole with much satisfaction. From the 27th of June to the 15th of November, one hundred and ninety-eight cars of fish were forwarded by it.

In December it became necessary to withdraw this train for a time to enable concentration of effort in moving the troops home, but the Canadian National Railways arranged to replace it by hauling two refrigerator cars on the Maritime Express and one on the Ocean Limited.

When the business increases to an extent that several cars of fish per day can be forwarded there seems to be no good reason why the requirements cannot be handled by fast freight, but in the meantime, when the demand has to be worked up, the need for an efficient and regular express refrigerator car service cannot be too strongly emphasized.

As was explained in my previous report, the payment of one-third the express charges on less-than-carload-lot shipments from the Pacific coast to points in the Prairie Provinces was modified in the fall of 1917, with the object of enabling a market to be worked up in these provinces for the different species of flounders and cod that abound on the Pacific coast, and that, as in the past, would be going to waste on account of lack of demand therefor. Under the modified arrangement no assistance is given on shipments of halibut and salmon, the market for which is now well established, but two-thirds of the transportation charges on shipments of other fish, whether by express or by freight, are paid. This assistance, coupled with the efforts of the Canada Food

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Board, has enabled a greater demand for these fish to be worked up than was even anticipated. During the calendar year 1918 over five million pounds of cod and flat-fishes—other than halibut—were marketed in the Prairie Provinces.

It was the intention to continue this arrangement, with a modification so that it would apply to fresh and frozen cod and flatfishes (other than halibut) only, for another year, but under the changed conditions that have come about, following the armistice, it has been found that with the assistance not applying to the Atlantic coast, it is causing an unfairness to the Atlantic coast dealers, who are now arranging to develop a greater demand for Atlantic fish in the Prairie Provinces.

In the circumstances it has been decided to discontinue the payment of any portion of the transportation from the Pacific coast after the end of August next so that from that date assistance of the character started in 1908 will be altogether discontinued.

The amounts paid, as one-third of the L.C.L. express shipments from both coasts, and under the arrangement obtaining from the Pacific coast since the fall of 1917, are as follows:—

Year.	From East Coast.	From West Coast.
1909-10..	\$15,162 20	\$13,541 76
1910-11..	16,898 13	21,896 73
1911-12..	19,620 62	35,315 10
1912-13..	29,969 48	39,277 13
1913-14..	37,818 85	44,114 47
1914-15..	26,667 33	34,528 60
1915-16..	27,122 69	34,872 56
1916-17..	32,717 73	36,799 80
1917-18..	49,550 89	46,371 84
1918-19..	37,366 31	53,480 98

The department will, however, continue its efforts to secure adequate transportation facilities and also to expand the demand for fish throughout the country and to these ends it has arranged to establish during the coming year a Publicity and Transportation Division in the Fisheries Branch.

BIOLOGICAL WORK.

Researches in biology were carried on during 1918 as usual, under the Biological Board, at St. Andrews, N.B., the estuary of the Miramichi river, New Brunswick, and at Departure bay, British Columbia.

The workers at St. Andrews included scientists from Toronto, McGill, Queens, Laval, and New Brunswick universities, also from St. François Xavier College, Antigonish, N.S., to whom were given the task of investigating the life-history of such fish as monk fish, and the sea-cat or wolf fish; eel-pout, sea-bass, and cod were also studied, and hydrographical and chemical researches carried on.

Dr. Huntsman, and some of the members of the staff, were engaged from May till September in important dredging and tow-netting operations in Miramichi bay.

Dr. Knight continued his investigations of the life-history of the lobster, at Caribou harbour, Nova Scotia, and took the lead in conducting an educational campaign amongst lobster fishermen with a view to the preservation of the fishery. The work at the British Columbia station was actively carried on by a staff from the universities of British Columbia and Alberta under the supervision of Dr. McLean Fraser, the curator of the station.

Dr. Fraser and his staff covered some problems of much interest to the salmon-fishing industry; and have practically completed a study of the life history of the various species of Pacific salmon.

A volume of biological memoirs, including sixteen separate researches, has been published, and a further volume, it is expected, will shortly appear. The forthcoming volume will consist of about a dozen reports embracing a variety of important fishery subjects.

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FISHERIES MUSEUM.

The specimens belonging to the Fisheries Museum, which had to be stored in various places when the museum building on O'Connor street was demolished to make room for a new departmental block, have not yet been reassembled for exhibition. The curator was, therefore, engaged during the year in making observations on the natural history of the lobster under the direction of Dr. A. P. Knight of the Biological Board. The data thus gathered contain much useful knowledge concerning the weight, size, sex, and condition of this crustacean at various times and places.

The curator also took part in the educational campaign carried on amongst fishermen and packers during the year, with a view to the conservation of the lobster.

FISH CULTURE.

The fish cultural operations for the calendar year, 1918, embraced the fresh water and anadromous species only, and were confined almost entirely to the commercial food fish, such as Atlantic salmon in the Maritime Provinces and Quebec; whitefish, lake herring, salmon trout and pickerel in Ontario and the Prairie Provinces, and Pacific salmon in British Columbia.

The commercial species were practically all distributed as fry, after the food-sac was absorbed, on the natural spawning areas, and largely where such eggs were collected, but a small percentage was reared to the advanced fry and fingerling stages.

The sporting species such as speckled trout in the East, and cut-throat and rainbow trout in the West, were hatched in small numbers, and practically all distributed in public waters, after adequate return was made to the areas where such eggs were obtained. A small percentage was allotted to privately controlled, or leased areas on the payment of nominal prices and all distribution expenses.

As the resources of the country were devoted to the prosecution of the war, and expenditures for other purposes were confined to absolute necessities, the service was not extended by the erection of new hatcheries, but the work was energetically carried on at existing establishments, and while there was a falling off in some species, the total distribution of fry and collection of eggs was 55,000,000 and 77,000,000 greater, respectively, than those for 1917. In whitefish the increase was, in the distribution, 71,000,000, and in the collection of eggs, 129,000,000.

The successful outcome was due to the conscientious and unsparing efforts of the field and hatchery officers, and greater co-operation with them on the part of the fishermen in some districts; to greater co-operation between the Dominion and Provincial Governments in the Great Lakes, and to more intimate relations between the Canadian and United States Government in contiguous waters.

The United States and Canadian Governments have combined in an effort to re-establish the sockeye fishery of Puget sound and the Fraser river. With this end in view the United States Bureau of Fisheries furnished 20,700,000 sockeye eggs from Alaska, which were hatched in the Harrison Lake hatchery, and the fry distributed in suitable spawning grounds in the Fraser River watershed.

There are thirty-four hatcheries, eleven subsidiary hatcheries, and seven salmon retaining ponds in operation. From these the total distribution of the different species in each province during the season of 1918, was as follows:—

Nova Scotia—			
Atlantic salmon.. . . .	7,057,600		
Speckled trout.. . . .	171,500		
			7,229,100
New Brunswick—			
Atlantic salmon.. . . .	8,696,662		
Ouananiche.. . . .	480		
Rainbow trout.. . . .	645		
Speckled trout.. . . .	161,835		
			8,859,622

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Prince Edward Island—		
Atlantic salmon.. . . .	510,175	
Speckled trout.. . . .	259,885	770,060
Quebec—		
Atlantic salmon.. . . .	6,080,743	
Ouananiche.. . . .	52,829	
Speckled trout.. . . .	104,542	6,238,114
Ontario—		
Whitefish.. . . .	253,410,000	
Salmon trout.. . . .	31,637,842	
Herring.. . . .	48,760,000	
Pickarel.. . . .	158,765,000	492,572,842
Manitoba—		
Whitefish.. . . .	253,010,000	
Pickarel.. . . .	23,050,000	276,060,000
Saskatchewan—		
Whitefish.. . . .	61,585,000	
Tullibee.. . . .	9,000	61,594,000
Alberta—		
Atlantic salmon.. . . .	66,200	
Ouananiche.. . . .	32,300	
Cutthroat trout.. . . .	109,500	
Salmon trout.. . . .	196,050	404,050
British Columbia—		
Atlantic salmon.. . . .	418,053	
Ouananiche.. . . .	14,000	
Cutthroat trout.. . . .	263,200	
Steelhead salmon.. . . .	102,040	
Kamloops trout.. . . .	929,775	
Sockeye salmon.. . . .	57,444,072	
Spring salmon.. . . .	2,965,639	
Cohoe salmon.. . . .	3,361,958	
Humpback salmon.. . . .	14,350,500	
Chum salmon.. . . .	5,649,000	
Speckled trout.. . . .	148,100	85,746,337
Total distribution.. . . .		939,474,125

A detailed report on the fish cultural operations of the department is being published separately, in pamphlet form.

OYSTER CULTURE.

During the season of 1918 the officer in charge of this service visited the various public and private oyster beds along the south shore of the Gulf of St. Lawrence, and examined and cleaned such as required attention; he also furnished expert advice to those taking up artificial cultivation on private beds.

Some 200 barrels of young oysters were transplanted from comparatively fresh water, up the Richibucto river, to a piece of ground near the river's mouth, where the water's salinity is much greater. It will thus be of much interest and importance, from a re-stocking point of view, to note the development of these young oysters in their new and more saltish bed.

The oyster areas at Cariboo, N.S., and Shediac, N.B., were duly raked and cleaned. It was found that while the transplanted American oysters on the Cariboo beds do not appear to grow very well, those transplanted from Prince Edward Island beds have thriven greatly.

At Richmond bay, Prince Edward Island, the officer conferred with the owners of private oyster grounds, regarding the blight, which, two years ago, attacked and killed off nearly all the oysters in the bay. He found the bay and the rivers entering it—

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except at the head of some of the streams where a few healthy live ones remained—practically denuded of live oysters. He is of the opinion, and in this he is supported by all the private cultivators, that it is useless to think of re-stocking until the blight has completely run its course.

FISHERIES PATROL SERVICE.

The Fisheries Branch has under its control a number of motor launches and small steamers, for the prevention of illegal fishing and for the general enforcement of the fisheries regulations in places where this cannot be properly done by land officers alone.

In patrolling Nova Scotia waters there were employed six of the department's own boats and three hired boats. One patrolled the waters of Northumberland strait, and two from Canso to the western boundary of Halifax county. Effective work was accomplished by both of these boats in suppressing illegal lobster fishing. Six boats patrolled the waters from Lunenburg county to Yarmouth county. A very active patrol was maintained, and very few violations of the law were reported.

In patrolling New Brunswick waters, four of the department's boats and one hired boat were employed. Three patrolled the waters of Charlotte county in the Bay of Fundy. The close seasons were generally well observed, but some illegalities, in the form of dynamiting pollock, occurred at times off Grand Manan. Three men were caught at this practice by the patrol boat officer and heavily fined, which put an end to further attempts at law breaking. Two boats patrolled the waters of the gulf counties, from Westmorland to Miscou island. One was engaged in supervising the salmon fishery at the mouth of the Miramichi river, and the lobster fishery along the coast, southwards. The other mainly patrolled the waters of Miscou and Shippigan islands, where illegally set lobster gear was found and destroyed, and the owners fined.

In patrolling Prince Edward Island waters, four boats were employed, mainly for the prevention of illegal lobster fishing. The efforts at illegal fishing in Prince county were persistent and a large amount of illegally used gear was broken up.

The Inspector of Fisheries for the province of Quebec makes use of a steamer for patrolling the gulf waters and enabling him to reach the widely separated and hardly accessible parts of his district. A hired motor boat was employed in patrolling the Magdalen Islands waters, where a number of lobster traps illegally set were seized and destroyed.

A small steamer owned by the department patrolled lake Winnipeg, in Manitoba, and assisted in the collection of fish eggs for the hatcheries of the lake during the season.

In patrolling the waters of British Columbia nineteen boats belonging to the department and nine hired boats were employed. Five boats patrolled the Fraser river, Howe sound, and part of the gulf of Georgia, in the southern district. Seven of the department's boats and nine hired ones patrolled the waters of the northern district. The regulations, on the whole, were well observed there, but a number of seizures were effected. Six departmental boats were engaged in patrolling the waters of the Vancouver island district, and in the course of the year made eleven prosecutions and eight seizures.

DRIFT-NET FISHING OPERATIONS.

During the summer of 1918, the department's steamer *Thirty-three* was equipped with herring and mackerel nets, and sent to sea for the purpose of demonstrating the drift-net method of fishing.

Operations began early in June, and continued till October. The fish caught were sold in the port nearest to the fishing ground on which operations were being, at the time, conducted and where buyers were found prepared to handle the catches.

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While it was not to be expected that the operations of one drifter would go far towards definitely determining the temporary location and marking the somewhat erratic movements of the herring and mackerel schools along the whole Atlantic seaboard, the results of this vessel's work, notwithstanding certain handicaps, would indicate that a regular drift net fishery for mackerel could be established, by a fleet of several boats, of a suitable size, working in conjunction and following the fish from the western end of Nova Scotia eastward and into the gulf of St. Lawrence, during May, June, and July.

The results would further indicate that a regular drift-net fishery for herring could be conducted, during July and August, by a similar fleet in the waters between Inverness county, Nova Scotia, and the east coast of Prince Edward island, which seem to be exceptionally well suited for the purpose.

A detailed report of the season's operations will be found as an appendix to this report.

FISH INSPECTION.

The inspection of pickled fish and barrels was carried on during the year 1918, as in the three preceding years, under authority of the Fish Inspection Act of 1914.

Prior to 1918 the work of inspection was confined to the Atlantic coast, where six inspectors were employed; but recent developments in the herring-curing business of British Columbia made the extension of the inspection scheme to that province necessary. Consequently, one inspector was appointed, towards the end of the past year, to advise packers and inspect their pack during the winter herring fishery on the Pacific coast.

Inspecting officers have no power to enforce the making of barrels or the packing of fish in accordance with the requirements of the Act. Notwithstanding that disadvantage, their efforts in the way of persuading and directing packers to use better packages and to pack better fish, have been on the whole productive of much good.

While the extent or value of the work of the inspectors cannot be judged alone by the number of barrels submitted—because of the practice of a number of packers who, after receiving instruction and advice from an inspector, sell and ship their fish without waiting for him to return and brand them—it is gratifying to be able to report that official inspection was made use of to a greater extent during the past year than in any previous year.

The following figures show the number of packers, who submitted their fish for inspection, and the quantity of fish inspected in each of the years in which the Act has been in operation:—

Year.	Packers.	Fish Inspected.
1915	16	1,320 barrels.
1916	73	7,213 "
1917	80	8,977 "
1918	110	20,664 "

In the year 1918, there were 16,667 barrels inspected on the Atlantic coast, and 3,997 on the Pacific.

Of the 20,664 barrels of fish inspected during the past season, 12,075 barrels were branded, while 8,589 did not receive the official brand. It should not be inferred therefrom, however, that the fish not branded were bad or unsaleable. As a matter of fact, most of them were good fish which, by reason of some defect in grading or in the quality of the package, fell somewhat short of the high standard required by the Act. It should be remembered that practically each lot submitted for inspection, whether branded or not, represented a more or less serious attempt by the packer at improved packing and compliance with the standards set.

Unfortunately, the services of three of the inspecting officers have been made little use of since inspection was instituted. Consequently, it was decided to ter-

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minate their engagement at the end of the year 1918. The names of the officers concerned are: H. H. Mann, Sydney, N.S., A. R. Hiltz, Mahone Bay, N.S., and Thomas Doyle, North Rustico, P.E.I. If any calls for inspection come from the districts of either of the discharged officers during the season of 1919, arrangements will be made to have such attended to by the remaining officers in the Maritime Provinces.

It is not customary for packers to send letters of thanks to the department for instruction and guidance given them in connection with this work, but two such were received recently—one from a packer in Nova Scotia, and the other from a packer in Gaspé—which may be quoted, to show something of the valuable nature of the work that is being carried on by the inspectors of pickled fish, covering as it does instruction in barrel making and fish-curing as well as the inspection of the finished product. The letter from the Nova Scotia packer. "Last summer, under your inspector's instruction, I cured some of our herring in the Scotch method, and am more than satisfied with the price received for same. When branding these fish the inspector informed me they were the finest cured fish he had branded this season. I simply followed his instructions, and I cannot understand why others don't do likewise."

The letter from the Gaspé packer: "I am writing to thank you for the services of your inspector, who instructed us and our men, this year, in the packing of herring in the Scotch style—the first to be packed in quantity on this coast. The inspector instructed us in the kind of barrels to be used, and had them shipped to us. Our packing was a success, and we obtained good value for our fish. Without the inspector's instruction we could not have operated. Again thanking you."

CANNERY INSPECTION.

No fish or shellfish canning establishment is permitted to operate in Canada, except under a license issued by this department, after it has been assured of the suitability of the place for the handling of human food. Each cannery so licensed is subject to inspection under authority of the Meat and Canned Foods Act, at any time during operations.

Throughout the canning season of 1918, the department's outside staff of fishery officers periodically inspected all fish and shellfish canneries, and generally supervised the sanitary conditions under which operations were carried on therein.

On the Atlantic coast, lobsters were canned in 529 establishments; sardines in 3; salmon in 3; clams in 15; and other fish—such as herring, mackerel, haddock, etc.—in 22. In the Prairie Provinces, lake-fish were canned in one establishment. On the Pacific coast, salmon were canned in 90 establishments; herring, pilchards, etc., in 22; and clams in 2.

There were 2,317 inspections made and reported on. In the course of the year defects were noted in the buildings and equipment of four establishments, and the owners required to have them rectified.

Inspection under the Act, as amended 1917, which becomes effective during the season of 1919, will be more definite and comprehensive. The salient features of the amended Act are: (1) the inspection of buildings, utensils, and fish in accordance with regulations made thereunder, and appended thereto; (2) the authority granted to an inspector to stop the canning of fish which he considers unfit for human food; (3) the authority granted to an inspector to seize such fish on view; (4) the marking of cans with the name and address of the packer or the dealer who obtains the fish directly from the packer; a true description of the kind of fish (the species of salmon packed in British Columbia must be named) and the weight of the contents of the cans; (5) the correct marking of canned fish imported into Canada, so as to show their kind and quality, the place of origin, and the name and address of the packer or importer.

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It is anticipated that through the agency of the amended Act, the standard of packing will be further raised and that both producer and consumer will benefit thereby.

BAIT-REPORTING SERVICE.

This service was instituted in 1913 for the purpose of providing masters of fishing vessels with definite information concerning bait supplies at points along certain parts of the Atlantic coast. The information is collected by officers of the Department, and sent by telegram daily to certain important ports and there posted up in a conspicuous place. It is also published in the Halifax and other daily newspapers. Copies of all telegrams are mailed weekly to headquarters at Ottawa, from where the work is directly supervised.

The service was continued during the season of 1918. In the spring months, 78 telegrams were sent from the Magdalen Islands, Souris, P.E.I., and Queensport, N.S., to Canso, Halifax, Lunenburg, and Riverport, N.S. In July and August, 130 telegrams were sent from Little Bras d'Or, L'Ardoise, Canso, Wine Harbour, and Musquodoboit Harbour, N.S., to North Sydney, Canso, Halifax, Lunenburg, and Shelburne, N.S.; also from Lockeport to Canso and Halifax, and from Shag Harbour and Digby, N. S., to Halifax, Shelburne, and Lockeport, N.S. From the beginning of September to the middle of November, 47 telegrams covering information as to supplies of bait in the counties of Charlotte and St. John, N.B., were despatched from Campobello, N.B., to Digby, Yarmouth, Pubnico, Clark's Harbour, Wood's Harbour, and Port La Tour, N.S.

That this service is beneficial alike to vessel fishermen in search of bait and net fishermen who have bait for sale, may be gathered from the following reports of the department's officers on the spot: Overseer Torrie, Digby, N.S.: "The bait reports have kept the boat fishermen informed as to what particular part of the county bait was being taken in. They have found the information of great value." Overseer Stoddart, Shelburne county, N.S.: "Owing to the great scarcity of bait in this locality, the reports were a great benefit. The fish dealers took advantage of the information contained in the reports, and wired localities where supplies were available and had fresh bait shipped to them; thus saving time to the fishermen and permitting them to continue operations. By means of the bait reports from New Brunswick, a good supply of lobster bait was secured and brought to the district. I may say that the bait reports during 1918 were of greater benefit than in any previous season". Overseer Walls, Shelburne county, N.S.: "I have talked with quite a number of the shore fishermen in my district, and also to many of the skippers of fishing vessels, and they have stated that it is a good thing for both net fishermen and vessel fishermen to have official reports of bait available". Overseer Hebb of Lunenburg county, N.S.: "I have made inquiries of the owners of Lunenburg fishing vessels, and they inform me that the results obtained from the publication of telegraphic reports concerning bait supplies last season were very beneficial, and their desire is that the service be continued". Overseer Cooper, Guysboro county, Nova Scotia: "Owing to the presence of submarines last summer, vessels did not visit my district for bait as in other years, but the bait reports kept the net fishermen in touch with the schools of bait, and in that way the benefit was great". Overseer Dillon, Guysboro county, N.S.: "The fishermen from Lunenburg and elsewhere, on arrival at points in my district where bait reports were posted, have found it a great convenience to have such information. I have thus been informed by vessel fishermen met and interviewed when going over my district".

FISHERIES STATISTICS.

Under an arrangement between this department and the Dominion Bureau of Statistics, as was noted last year, the latter now compile and publish the annual statistics relating to the fisheries, as part III of its Census of Industry. The inform-

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ation is secured partly from manufacturing establishments, on individual schedules designed to fit in with the Bureau's general scheme of securing industrial statistics, and partly by the officers of this department, as in the past, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department as before, and afterwards handed over to the Bureau of Statistics for publication. The new schedules were used for the first time, in taking statistics for 1918, and as neither the manufacturers nor the officers were quite clear, at the first, as to the filling in of the schedules, much correspondence resulted; while many of the returns had to be sent back for correction more than once. The delay thus caused prevented the Bureau of Statistics from having the full statistics compiled in time to permit of summarized tables being published in this report, the preparation of which has been postponed until now in the expectation that such tables would be available. Consequently, a general review only, made up from information obtained by the department from time to time, is given herein.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department, and made public through the press, monthly.

FISHERIES EXPENDITURE, 1918-19.

		Appropriation.	Expenditure.
		\$	\$ cts.
Salaries and disbursements, Fishery officers.....	\$251,883.54	500,000	466,867 88
Fisheries patrol service	209,829.35		
Oyster culture.....	5,154.99		
Fish breeding.....			
Cold storage and transportation of fresh fish.....			
Building fishways.....		300,000	241,211 61
Legal and incidental expenses		110,000	107,957 85
Fisheries Intelligence Bureau		10,000	5,728 16
Toronto exhibition		4,000	1,357 08
Inspection of canned or pickled fish.....		5,000	2,090 44
Marine Biological Board		5,000	4,295 25
		15,000	11,966 39
		26,000	26,000 00
Totals.....		975,000	867,474 66
Fishing bounty		160,000	159,675 25
Paid out of Consolidated Revenue Fund.....			4,618 29

Provinces.	Salaries and Disbursements of Fishery Officers.	Fish Breeding.	Fisheries Patrol Service.	Building Fishways and Clearing Rivers.	Inspecting Canned and Pickled Fish.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia	58,600 78	17,233 22	34,002 19	6 92	5,355 50
Prince Edward Island	9,173 49	3,003 84	4,379 11		1,285 60
New Brunswick.....	49,013 23	36,351 19	14,140 73		2,560 56
Quebec	7,095 93	12,923 27	41,563 30		50 00
Ontario.....		64,996 55			
Manitoba	11,587 83	29,405 83	22,058 23		
Alberta.....	15,267 84	4,920 96			
Saskatchewan.....	16,966 00	5,529 72			
British Columbia.....	70,598 27	59,048 99	85,068 41	5,721 24	2,317 62
Yukon	531 50				
General account.....	13,048 67	7,798 04	8,617 38		7 11
Totals ...	251,883 54	241,211 61	209,829 35	5,728 16	11,966 39

FISHERIES REVENUE, 1918-19.

	Amounts Collected.	Refunds.	Net Amounts.
	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	7,629 31	16 50	7,612 81
Prince Edward Island.....	2,561 19		2,561 19
New Brunswick.....	16,420 52		16,420 52
Quebec.....	8,135 80	14 00	8,121 80
Ontario.....	631 85		631 85
Manitoba.....	12,780 20	50 00	12,730 20
Alberta.....	10,293 15	5 00	10,288 15
Saskatchewan.....	4,982 83		4,982 83
British Columbia.....	59,349 94		59,349 94
Yukon.....	425 00		425 00
Totals.....	123,209 79	85 50	123,124 29

FISHING BOUNTY.

Under authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1918, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$6.25 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen, entitled to receive bounty, \$3.80 each.

There were 14,452 bounty claims received, and 14,440 paid. In the preceding year, 14,532 claims were received, and 14,516 paid. The total amount paid was \$159,675.25, allocated as follows:—

To 784 vessels and their crews..... \$ 53,298 30

To 13,655 boats and their crews..... 106,376 95

The following table shows in detail the payment of the bounty by counties, for the year 1918:—

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Provinces and Counties.	No. of Vessels.	Tonnage.	Average Tonnage.	No. of Men.	Amount Paid.	No. of Boats.	No. of Men.	Amount Paid.	Total bounty paid to vessels and boats, 1918.
<i>Nova Scotia</i> :—					\$ cts.			\$ cts.	\$ cts.
Annapolis.....				1	6 30	183	289	1,281 20	1,281 20
Antigonish.....	25	411	16	131	1,230 70	169	238	1,073 40	1,073 40
Cape Breton.....						485	915	3,962 10	5,192 80
Cumberland.....						4	6	26 85	26 85
Digby.....	9	401	44	102	1,037 50	410	700	3,070 00	4,107 50
GuySBorough.....	54	856	15	250	2,419 50	856	1,366	6,049 40	8,468 90
Halifax.....	63	1,011	16	302	2,809 75	1,308	1,776	8,051 75	10,951 50
Inverness.....	26	363	13	126	1,131 25	401	799	3,437 40	4,588 65
Kings.....						53	74	334 20	334 20
Lenenburg.....	161	8,805	54	2,312	23,256 65	547	638	2,971 40	26,228 05
Pictou.....	2	38	19	8	88 00	62	86	388 90	476 90
Queens.....	17	38	12	27	506 75	151	241	1,066 85	1,573 60
Richmond.....	42	792	18	47	2,211 75	532	924	4,063 30	6,275 05
Shelburne.....	35	797	22	252	2,373 15	617	1,131	4,927 15	7,300 30
Victoria.....	12	148	12	61	529 90	324	488	2,179 20	2,709 10
Yarmouth.....	25	969	38	331	3,038 75	163	317	1,367 60	4,406 35
Totals	471	14,804	31	4,150	40,749 95	6,280	9,991	44,250 70	85,000 65
<i>New Brunswick</i> :—									
Charlotte.....	8	123	15	33	329 45	380	627	2,762 80	3,092 25
Gloucester.....	259	3,700	14	1,104	10,601 60	220	27	2,222 95	12,824 55
Kent.....	14	149	10	38	386 75	44	79	344 20	730 95
Northumberland.....	4	73	18	12	148 00	6	15	63 00	211 00
Restigouche.....						9	15	66 00	66 00
St. John.....						30	42	189 60	189 60
Totals	285	4,045	14	1,187	11,465 80	689	1,305	5,648 55	17,114 35
<i>Prince Edward Island</i> :—									
Kings.....	5	92	18	12	167 00	456	648	2,918 85	3,085 85
Prince.....	10	144	14	38	381 50	527	1,317	5,531 90	5,913 40
Queens.....	2	25	12	6	62 50	145	312	1,330 60	1,393 10
Totals	17	261	15	56	611 00	1,128	2,277	9,781 35	10,392 35
<i>Quebec</i> :—									
Bonaventure.....	2	26	13	7	69 75	1,059	1,888	8,247 15	8,316 90
Gaspe.....	6	69	11	28	244 30	3,377	6,908	29,635 85	29,880 15
Rimouski.....						86	110	504 20	504 20
Saguenay.....	3	45	15	18	157 50	1,026	1,916	8,309 15	8,466 65
Totals	11	140	12	53	471 55	5,558	10,822	46,696 35	47,167 90
Grand Totals	784	19,250	24	5,446	53,298 30	13,655	24,395	106,376 95	159,675 25

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REVIEW OF THE FISHERIES OF 1918.

Detailed figures, compiled and completed, for the year 1918 are not yet available, but the information at present in the department is sufficient to permit of a general review and an approximate analysis of the year's fishing results being made in order to convey some idea of the increase or decrease in the production of the various kinds of fish as compared with the preceding years.

The estimated value of the fisheries of the whole of Canada in 1918 will exceed that in 1917, which amounted to \$52,312,044. But as the catch of most of the chief kinds of sea fish in 1918 was less, owing to some rather unusual conditions, on the Atlantic coast especially, the greater value is attributable to higher prices alone.

The first quarter of the year was marked by abnormally cold and stormy weather on the Atlantic, with ice infesting many harbours that are, as a rule, free from such obstructions. Indeed, the weather during each month of the year, with the exception of May, the latter half of July, and the whole of August and December, was characterized as very unfavourable for fishing—especially for boat fishing. Further, fishing, during August and September, both inshore and offshore, was very greatly interfered with by the presence of an enemy submarine, which sank several Lunenburg county vessels, one Yarmouth county vessel, and a Halifax steam trawler. Finally, the epidemic of influenza which over-ran the country caused many fishing vessels to be laid up while it lasted.

ATLANTIC FISHERIES.

Cod, Haddock, Hake, and Pollock.

The quantity of cod landed was about 14 per cent less, and that of haddock, hake, and pollock each about 20 per cent less, than in the preceding year. While all the provinces show a shortage of cod, Quebec and Prince Edward Island show the highest percentage of decrease. The Lunenburg bank fishing fleet set out in the beginning of the year in somewhat greater force, and returned with an increased spring catch. The total quantity landed by the fleet for the whole season, however, was slightly less owing to the loss of vessels and the general interruption of operations by enemy undersea craft. In the northern parts of Cape Breton the high price of cod induced more fishermen to engage in that fishery with very satisfactory results.

The haddock catch of Nova Scotia the chief producer of these fish, was about 25 per cent less. This decrease was mainly due to the fact that at Ingonish, where haddock are caught largely in traps, the fish failed to appear as abundantly as usual in the spring. During May and June, 1917, there were taken at Ingonish, 160,000 cwts., whereas in May of 1918 none appeared and in June and July not more than 50,000 cwts. were caught.

Herring, Sardines and Mackerel.

The total quantity of herring taken was about 10 per cent greater. There was a small catch in Nova Scotia which was offset by an increased one both in New Brunswick and Quebec. As more attention is being given to the preparation of spring herring for food along the Gulf shores, this fishery is growing in importance and value. Owing to the sudden ending of the war towards the end of the year, the demand for salted herrings unfortunately fell off, and considerable quantities had to be either sold at a low rate or carried over till the succeeding consuming season.

The mackerel fishery resulted in a catch about 10 per cent greater than that of last year. More were landed in Prince Edward Island and Nova Scotia, but the catch in New Brunswick was less. Quebec produced about the same quantity as in the preceding year.

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The sardine fishery of the Bay of Fundy opened in a rather unpromising manner, but before the end of the season fish were abundant, so that with a large catch and high prices fishermen had a good season. The sudden ending of hostilities in Europe caused a drop in both the demand for and the price of the canned product, and packers were caught with large supplies on hand which afterwards were difficult to dispose of except at a price much below what was anticipated when the raw material was purchased.

Other Sea Fish.

Albacore, swordfish, and halibut are taken mainly by Nova Scotia fishermen. The quantity of halibut landed was about 20 per cent less, and of albacore and swordfish but slightly less than in the preceding year.

Shellfish.

The lobster catch of 1918 was little more than half the annual average catch of the four preceding years. The falling-off was common to all parts of the coast, but in some provinces it was much less pronounced than in others. For instance, the decrease from the preceding year in Quebec was 9 per cent and in Nova Scotia 35 per cent, while in New Brunswick it was 62 per cent and in Prince Edward Island 60 per cent. It should be noted, however, that on those sections of the coast where the decrease was greatest—northern New Brunswick, Prince Edward Island, and the Nova Scotia counties bordering the strait of Northumberland—the fishing period was extended for a month in 1917.

An analysis of the catches by counties in the provinces of Nova Scotia and New Brunswick shows the following: In the Gulf counties of the former province, Inverness, Antigonish, Pictou, Colchester and Cumberland the decrease was 45 per cent, attributable mainly to Pictou and Cumberland. In the eastern Atlantic counties, Victoria, Cape Breton and Richmond, there was a 27 per cent decrease. In the central counties, Guysborough and Halifax, the decrease was 31 per cent, chiefly in the latter county during April and May. In the western counties, Lunenburg to Digby, there was a decrease of 30 per cent. The range of decrease in the western counties was considerable; for example, the Shelburne county catch was 18 per cent less, while Yarmouth's decreased 30 per cent and Digby's about 38 per cent.

The decrease in the 1918 lobster catch is undoubtedly a serious one, and to some may, at first sight, seem to foreshadow the immediate end of this important branch of the fishing industry. But, while scarcity of lobsters on some of the fishing grounds may have had something to do with it, to other causes must the unsatisfactory results be chiefly attributed. During spring time, protracted spells of stormy weather and abnormal ice conditions prevented fishermen from operating regularly. Also, the greatly increased cost of lobster gear deterred fishermen from readily replacing lost equipment and carrying on as vigorously as in other years.

The quantity of oysters taken was slightly greater than in the preceding year. The catch of clams was also greater in all the provinces except New Brunswick.

River-Spawning Fish.

The total catch of Atlantic salmon was about 20 per cent less than an average one. In Nova Scotia there was a decrease of about 28 per cent, and in Quebec one of about 40 per cent. In New Brunswick, on the other hand, there was an increase of about 5 per cent; St. John county, in the Bay of Fundy, shows a decrease of 17 per cent, while the Gulf counties show an increase of 10 per cent. A curious thing about the increase in the Gulf counties is that, while Northumberland, the chief salmon county, shows an increase of 50 per cent, all the other counties show decreases of from 20 per cent to 50 per cent.

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The catch of smelts was very little less than in the preceding year. High prices were paid, and fishermen had a remunerative season.

The catch of alewives as a whole was less. In the county of St. John, New Brunswick, the chief centre of this fishery, there was a decrease of nearly 20 per cent, but in the Gulf counties of New Brunswick, the section next in importance to St. John county in the production of alewives, there was an increase of 20 per cent.

The quantity of shad taken was rather less than in the preceding year.

INLAND FISHERIES.

In what is called the inland district of New Brunswick, which comprises the St. John river system, alewives were not so abundant as in the preceding year, but an increase in value offset the decreased quantity taken. Salmon fishing on the St. John river during the 1918 season was not so good as usual, mainly owing to the lateness of the run. In the northern sections of this inland district excessive rain kept the brooks very full of water, consequently trout fishing was not quite up to the average.

In the Great Lakes of Ontario, fishing for whitefish resulted in a catch of about 11,000 cwts. more than that of 1917. Almost all the increase, however, came from the Lake Superior district. Lake Ontario produced 1,700 cwts. more, but the output of lake Erie was 1,100 cwts. less. The total quantity of herring taken was slightly less than the preceding year's catch, notwithstanding a very considerable increase in the production from lake Superior. The lake Erie catch was several thousand cwts. less. Neither pickerel nor pike came up to the previous year's total, but there was quite a large increase in the catch of trout.

Fishing results in Manitoba, as a whole, were satisfactory. The summer fishery for whitefish in lake Winnipeg was good, and before the season closed fishermen had caught their allotted quantity. Pickerel and tullibee were not found so plentifully as in the preceding year, which may have been due to the fact that the winter fishery was held up by the late formation of ice on the lakes. The fishery in lake Winnipegosis and the lakes in the western part of the province resulted in about the same quantity being taken as in 1917. Higher prices were paid for all kinds of fish and the total value is thereby greater.

Weather conditions were ideal for winter fishing in Saskatchewan during the 1918 season, and despite the influenza epidemic, which interfered with operations and caused numerous deaths amongst those engaged in fishing, reports from the various districts show that in the northern part of the province especially the fisheries were very successful. It is reported also that the fish in many of the lakes that have been fished for some years have improved in size and quality, as a result of the thinning out of the supply which, in some cases, was greater than the lake could well sustain.

Both the catch and the size of the fish at Lesser Slave lake, which provides the chief fish supply for the province of Alberta, were satisfactory. A feature of the year's operations was the fishing of several lakes in the north which had not previously been fished commercially. Some of these are over a hundred miles from the nearest railway, and, as can be well imagined, transportation of the fish to market is a difficult and expensive undertaking.

In Southern Alberta angling was not so good as in the preceding year owing to the lack of rain and the drying up of a number of the smaller streams.

PACIFIC FISHERIES.

Salmon.

The salmon fishery, as a whole, during 1918 was successful. While certain kinds of salmon were not very abundant in some sections of the coast, other varieties appeared in greater quantities in other sections.

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In the southern district, which is practically the Fraser River district, the failure of the big run of sockeye in 1917 was followed by a small pack in 1918. Other varieties were much less abundant than was expected. The total pack on the Fraser was, therefore, smaller than that of the preceding year.

In the northern district which extends from Smiths inlet to Naas river, and includes Queen Charlotte islands, the aggregate pack of salmon greatly exceeded that for the year 1917. Sockeye were plentiful in the Skeena river, but in Rivers inlet the run of these fish was poor. Spring salmon fishing was very good, and the results equalled those of the good seasons of five or six years ago. The varieties known as pinks and chums were very abundant all over the northern district, and prices were high.

In the Vancouver Island district, which covers the whole island and part of the mainland adjacent to the north end of it, fishing operations on the whole were very successful. Salmon fishing was very good, especially off the west coast, and a largely increased catch was landed. Chums were in great abundance.

Trolling for salmon with hook and line has become very popular all over the coast. Besides being an inexpensive method of fishing it is very remunerative. For that reason, the number of those engaging in it has increased enormously in the last year or two.

Halibut.

The halibut fishery suffered to some extent through the influenza epidemic, which disabled the crews of most of the vessels for a time. Notwithstanding this drawback the combined catch of Canadian and American vessels was looked upon as very satisfactory. Fishing operations were carried on in Hecate Straits and off the west coast of Queen Charlotte islands by the smaller vessels of the fleet, but the larger boats operated in the Gulf of Alaska far to the northward.

Herring.

The herring catch was very much greater than in the preceding year, and greater quantities were canned and pickled. These fish were extremely abundant in the Barclay Sound district on the west of Vancouver island; they appeared early and remained in abundance all through the season. Nanaimo harbour and the neighbouring bays and inlets on the east coast of the island were filled with herring early in the winter season, but little attention was given to catching them until the season was well advanced.

Other Sea Fish.

Pilchards were taken in large quantities on the west coast of Vancouver island, and more than ever of this delicious fish were preserved in cans.

The catch of black cod would appear to be not quite so large as in the preceding year.

Steam trawling was successfully carried on by two trawlers off the northern coast of the province, and good catches of excellent flatfish were secured throughout the year.

Whales.

One whaling station only, operated on the west coast of Vancouver island, but the catch, 246 whales, was almost as great as that of the preceding year when two stations were at work. The whaling stations at Rose harbour and Naden in the northern district were operated successfully also, and the total catch of the three stations was 500 whales.

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It is interesting to learn that nearly 30,000 cases of whale meat were packed, in the course of the year, and sold in a ready market.

REMARKS.

Four steam trawlers operated out of Atlantic ports and two out of Pacific ports during the year, with marked success, and indications point to further developments in this respect.

Line fishing, too, has progressed, and larger motor boats of a size capable of fishing on any of the nearer Atlantic banks have taken the place of the old medium-sized sailing vessels, in many places.

The very hazardous nature of the fishing industry is evidenced by the annual toll of human lives paid by those who carry it on, and I regret to say that no fewer than 47 men, 28 on the Atlantic and 19 on the Pacific, were lost to us while prosecuting their calling during the year.

In concluding, I desire to say that my thanks are due to the officers and clerks of the Fisheries Branch for their loyal co-operation with me in carrying on the work of the Branch; and, further, that their duties throughout the year have been performed in a most,praiseworthy manner.

I am, Sir, your obedient servant,

G. J. DESBARATS,
Deputy Minister of the Naval Service.

APPENDIX 1.

REPORTS OF INSPECTORS OF FISHERIES.

REPORT OF INSPECTOR A. G. MACLEOD, OF SYDNEY, N.S., ON THE FISHERIES OF DISTRICT No. 1, NOVA SCOTIA, FOR 1918.

The season was rather unfavourable, on account of the late spring and unsettled weather, and the quantity of fish caught was less than it would otherwise have been, but prices ruled abnormally high. Consequently, the fishermen had a very prosperous year.

LOBSTERS.

Owing to the drift ice remaining late on the coast, fishing operations did not begin along the northern part of the district until the 21st of May, at which time the great bulk of the spring herring had passed by, thus causing a great scarcity of bait, which was a serious handicap to the fishermen.

On account of the cost of lobster gear having advanced tremendously, the fishermen did not supply themselves with new equipment to replace that lost during the previous season. This, together with the unsettled state of the market and with fewer men engaged in the industry—many of the fishermen having enlisted for overseas—was the cause of the catch being lower than that of the preceding year; for, apparently, lobsters were fairly plentiful. At L'Ardoise, Richmond county, there was a decrease of 4,000 traps, and from Bay St. Lawrence to Neil's Harbour there were 4,060 traps less in operation than in the previous year.

SALMON.

This branch of the industry was a failure all along the coast, with the exception of L'Ardoise, Richmond county, where good catches were made after the 15th of June. In the principal sporting river—the Margaree of Inverness county—during the fly fishing season, salmon were not up to the average; but they ascended in very large quantities in the fall, and the river was teeming with them in October and November.

COD.

The high prices paid for cod caused more of our fishermen to engage in trawl line fishing to a greater extent than heretofore, which proved very profitable, especially at Ingonish, Victoria county, and Eastern Harbour, Inverness county. The fishermen of the former port reaped a harvest during the latter part of December, for cod of the largest size and choicest quality struck that coast in very large quantities—some of the fishermen having averaged \$45 per day.

HADDOCK.

The catch of haddock fell behind that of the previous year, owing to the drift ice hugging the coast unusually late in the spring. At L'Ardoise, Richmond county, a trap net operating there did remarkably well in June.

MACKEREL.

Large schools of mackerel appeared on the Inverness coast at a late date, but would not take the hook. The catch was lower than in 1917, caused, principally, by unfavorable weather and the epidemic of influenza which raged throughout this district at the time when the mackerel struck the coast.

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HERRING.

Herring were very plentiful along the southern coast of Inverness, Richmond, and Cape Breton counties during the months of July and August, and were it not for unsettled weather and scarcity of salt, the catch would have been very much larger.

VESSELS AND BOATS.

The condition of the fleet shows a great improvement over the preceding year, owing to the fact that many new craft have been added to the fleet and a better grade of engine installed in the old ones. At Ingonish, Victoria county, one vessel owned by Parkhurst Fisheries, Ltd., of Gloucester, Mass., was run down by another schooner and sunk, but no lives were lost.

DEVELOPMENTS.

The catching of blackfish at Pleasant Bay, Inverness county, is a new branch of the fishing industry in this district. This fish is caught with the regular barbed pole used for swordfishing. After taking off the fat, the carcass is thrown away as a rule, but, in some cases, the meat has been fried and pronounced to be as delicious and palatable as beefsteak.

LOSSES.

A storm of unusual severity swept along the Atlantic coast on the 14th of November, accompanied by a tidal wave which caused tremendous destruction, not only to wharves, stages and piers, but to fishing boats, nets, and even fish that had been packed away in fish houses. Great damage was done at Bay St. Lawrence, Cape North, Aspy Bay, New Haven, Neil's Harbour and Ingonish, Victoria county; and at Main-à-Dieu, Baleine, Lorraine, and Louisbourg, Cape Breton county. Total estimated loss \$54,000. I regret to report the drowning of one fisherman at New Haven, Victoria county, on the 14th November.

NEEDED IMPROVEMENTS.

As the fishermen of Bay St. Lawrence, White Point, Aspy Bay, New Haven, Neil's Harbour, and North Ingonish, Victoria county, are operating at great risk to life and property on account of having no harbour, I would like to impress upon the department the great necessity of making provision for shelter to fishing boats at these ports, in order that the fishermen may equip themselves with larger boats, and thus be enabled to reach the best fishing grounds. In the district of Port Hood, Inverness county, the only place of safety for boats during fall fishing is at Port Hood island. Consequently, a large number of fishermen, chiefly from the southern end of the district, cannot take advantage of this shelter. Therefore, I would strongly recommend that the Government assists by constructing a shelter for their boats at the mainland.

CLOSE SEASONS.

The close seasons have been well observed. I may say that the new system of appointing fewer guardians, with larger salaries, has been productive of very beneficial results. As smelts are late in ascending our streams for spawning, I would recommend that the close season be extended to July 31.

ILLEGAL FISHING.

In order to prevent illegal fishing, the guardians are required to patrol at irregular intervals and perform their duties in such a manner that it is utterly impossible for any person to know where they may be stationed at any time. There were three prosecutions for attempts at illegal fishing in the Margaree river and convictions secured in each case, the offenders being fined \$25 each, with costs.

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GENERAL REMARKS.

The regulation governing sawdust and mill refuse is carefully respected, for mill owners, as a rule, are desirous of affording every protection to the fish entering our streams.

The fishways in my district are in good condition.

There were no patrol boats in use in this district with the exception of two small motor boats supplied for the use of the special head guardians, Malcolm W. Ferguson, on the Mira river, and Pat. McDonald, on the Margaree river.

Two gaspereaux nets, two boats, and nineteen lobster traps were confiscated.

The following licenses were issued in my district: smelt gill net, 115; smelt bag net, 11; trap net, 81; lobster, 47; lobster extension, 23; angler's permits, 19; oyster, 81; mackerel canning, 1; haddock canning, 1.

VICTORIA FISHERIES PROTECTIVE ASSOCIATION.

It affords me great pleasure to express to you my high appreciation of the faithful and invaluable services rendered by the active and competent secretary of this association—Mr. George Kennan, D. L.—for, with his hearty support and co-operation we have been enabled to procure greatly improved protection for the principal angling rivers of this district.

REPORT OF INSPECTOR ROBERT HOCKIN, PICTOU, N.S., ON THE FISHERIES OF DISTRICT No. 2, NOVA SCOTIA, FOR 1918.

The catch of deep sea fish—cod, haddock, hake, and pollock—is estimated to be somewhat less than last year. Herring shows a considerable increase, and mackerel a slight decrease. The catch of halibut is much greater.

The quantity of salmon taken was slightly less than that in the previous year. On the Atlantic coast the fishery was nearly as good as last year; on the strait of Northumberland there was a greater falling off, while in the Bay of Fundy the reports indicate a considerable increase.

Over the whole district, we are confronted with the fact that the catch of lobsters was only about 25 per cent that of last year. On the strait of Northumberland the decline is about 50 per cent, and on the Atlantic coast about 25 per cent.

An unusual incident was the stranding of about one hundred and twenty large fish at Cape John, in Pictou county. They were from 10 to 20 feet long, the average being about 15 feet, and the weight of the largest about 4,500 pounds.

When the fish were seen on Tatamagouche bay, some parties went out in motor boats, which frightened the fish, causing them to swim towards the shore until they were grounded. Some of the fish which had turned seaward afterwards followed the school, until they also grounded. The best description I have of the fish is in an encyclopedia in which they are spoken of as the caaing whale, of which it is said that schools of 50 to 100 impetuously follow the leader ashore—when alarmed and surrounded—in a bay or fjord. It is recorded that 1,100 were killed in the winter of 1809 in Iceland. They have been called by various names, e.g., blackfish, pilot whale, etc. Very little use was made of the fish. The inhabitants were not prepared to render the oil, and most of them were used for fertilizer.

PROSECUTIONS.

There were thirty-one prosecutions for violations of the Fisheries Act; two for fishing for gaspereaux out of season; seven for allowing sawdust to pass into waters frequented by fish; eighteen for fishing for salmon in close season; two for having

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salmon in possession in close season; one for neglecting to build a fishway. Convictions were secured in twenty-six cases. Twenty-two nets and two spears were seized for violation of the Fisheries Act, and confiscated.

The following licenses have been issued during the year: 1 lobster pound, 63 lobster canning, 20 lobster extension, 13 herring weir, 167 drag seine, 26 salmon net, 44 trap net, 1 fish cannery, 64 oyster fishery, 3 angler's permits, 81 smelt gill-net, 149 smelt bag-net, 1,160 lobster fishing.

REPORT OF INSPECTOR H. H. MARSHALL, OF DIGBY, N.S., ON THE FISHERIES OF DISTRICT No. 3, NOVA SCOTIA, FOR 1918.

With regard to the condition of the fleet of vessels and boats, there has been a slight increase in the number of boats for the district, by the addition of a number of larger high power motor boats that are being used in fishing. There has been a slight decrease in the fleet of vessels, owing largely to the presence of a submarine on this coast, which sank eight of the fleet from Lunenburg alone, viz.: *Lucille M. Schnare*, *E. B. Walters*, *Uda A. Saunders*, *Potentate*, *C. M. Walters*, *Gloaming*, *Verna Adams*, and the *Elsie Porter*. The fishing schooner *Otokia* was lost with all on board on her way home from the Grand Banks. The remainder of the district remains about the same, and I am advised that arrangements have been made for the construction of five steam trawlers by Lunenburg parties during the next season. There have been a number of developments worthy of note in this district, such as the steam trawlers under construction, above noted. A five million pound cold storage plant has been constructed at Liverpool, Queens county, and I am advised that it is one of the finest of its kind in the Maritime Provinces. A large fish cannery is being constructed at Freeport, Digby county, by the Frank E. Davis Co., of Gloucester, Mass. This, I believe, is one of the most up-to-date, and will be capable of handling a large output. There have also been quite a large number of additions to other canneries in this district.

There have been very few offences reported, and the close seasons have been quite well observed. This may be largely accounted for by the presence of the patrol boats, as we have had a very active patrol, the operations of which have been very satisfactory for the season.

Very little trouble has been experienced with the mills on our rivers and fishing streams from sawdust and mill refuse, as the regulations respecting this matter have been generally well observed.

With respect to the fishways in this district, they are all reported as efficient as they ever were, and all in operation. There are two new ones under construction, one at Lawrencetown, on the Annapolis river, and one at Charleston, on the Medway, which, when completed, I think will be satisfactory and efficient.

The following is a statement of the number of licenses issued during the 1918-19 season:—

Lobster packing.. . . .	44
Lobster extension.. . . .	30
Cannery licenses.. . . .	13
Special angling permits.. . . .	59
Smelt bag-net.. . . .	24
Trap-net.. . . .	68
Smelt gill-net.. . . .	50
Lobster pound.. . . .	10
Herring weir.. . . .	87
Scallop licenses.. . . .	221

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REPORT OF INSPECTOR S. T. GALLANT, CHARLOTTETOWN, PRINCE
EDWARD ISLAND, ON THE FISHERIES OF PRINCE EDWARD
ISLAND FOR 1918.

LOBSTERS.

Fishing commenced May 6, and fair weather prevailed throughout the season, but owing to the scarcity of lobsters only a very few packers operated the whole season. It is thought that the extension of the lobster season in the fall of 1917 was partly responsible for the small catch in 1918.

COD.

This fishing is carried on chiefly with trawls, and although the catch was somewhat below the season of 1917, increased values were realized in 1918, bringing the total value about the same.

There was an increase in the catch of haddock over that for last year.

There was a good catch of hake, and good prices were obtained.

HERRING.

These were again scarce on this coast during spring, and great difficulty was experienced in procuring a supply for lobster bait, but there was a great increase in the quantity for August, and very high prices were realized.

SMELTS.

The catch of smelts was about the same as in 1917, but the prices obtained were much lower than the prices realized in that year. This was partly due to mild weather and to transportation, which was altogether inadequate to carry the fish that was being offered. The result was that some of this fish was six and seven days on the road to the Boston market, and had to be destroyed on arrival.

OYSTERS.

The catch of oysters was about the same as the season 1917, but values increased. The disease which last season killed the oysters in Richmond bay and Grand river has somewhat abated, and it is hoped that it has now run its course. In some parts of this bay and Grand river there was a fair catch of spat, and the small oysters seem to be developing naturally.

MACKEREL.

I have to report a large increase in the catch of this fish, principally caught with nets. Increased prices were obtained so that the fishermen were well pleased with the season's operations.

There was a large increase in the catch of alewives, and a small decrease in the catch of trout, but an increase in value.

LICENSES ISSUED.

Lobsters.. . . .	181
Lobster extension.. . . .	49
Quahaug.. . . .	38
Fish trap.. . . .	7
Oyster.. . . .	215
Smelt gill-net.. . . .	211
Smelt bag-net.. . . .	245
Fish cannery.. . . .	14

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REPORT OF INSPECTOR J. F. CALDER, CAMPOBELLO, N. B., ON THE
FISHERIES OF DISTRICT No. 1, NEW BRUNSWICK, FOR 1918.

The year just closed was a very profitable one for practically all fishing interests. The efforts of the fishermen were, at least, fairly successful in all branches, and remarkably so in several. High prices were paid for all kinds, and the total value of the catch was greatly in excess of that for any other year.

Fishing vessels are fast disappearing from the district. More money can be made by fishing in large gasoline boats. Fishermen operate on all Bay of Fundy grounds in these boats, in many instances going as far out as the Grand Manan Bank. A splendid type of gasoline fishing boat is built in the district; these boats meet the fishermen's needs better than any other kind of craft, and while their number and efficiency are steadily increasing, as already stated, the sailing vessel is fast disappearing.

Gill nets are being introduced for the first time in the cod and pollock fishery. It is too early yet to form an opinion as to the effect of such operations.

The sardine herring season was a very successful one. A large catch was landed and sold at a good price. Unfortunately the packers were caught with large supplies of the canned product on hand when the armistice was signed, and as the price of canned fish has steadily decreased since then, the prospects for the coming season are not good.

Generally speaking, the close seasons were well observed. A few lobster traps were put out from time to time at different places, but they were soon located and destroyed by the patrol boats.

The principal illegal fishing that had to be contended with was the destruction of fish by means of dynamite off White Head, Grand Manan. As the pollock grounds there cover a very large area, a great portion of which is outside the three-mile limit, it is possible for more of this work to be carried on in spite of the best efforts of the most efficient officer. We have a splendid officer in Mr. Medley B. Green who patrols this area. He succeeded in catching three men engaged in dynamiting fish. They were prosecuted, convicted, and heavily fined. Such action had a splendid effect, for I do not believe any more dynamiting was done during the season.

The condition of the streams, in so far as sawdust and mill refuse are concerned, is better than it has ever been in the past.

The fishways were kept open as long as it was necessary. The one in the dam at Porter's Mill stream does not appear to be effective for gaspereaux. The fishway in the Cotton Mill dam at Milltown was taken out in order that needed repairs be made to the dam. A log sluice-way around the dam was kept open and well supplied with water; no doubt, the sluice-way was as effective as the other fish pass.

The following is a statement showing the number of licenses of various kinds issued in my district, during the 1918-19 season:—

Herring weir.....	799
Lobster pound.....	2
Cannery licenses.....	8
Permit to dig soft-shell or long-neck clams.....	54
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	864

REPORT OF INSPECTOR D. MORRISON, NEWCASTLE, N.B., ON THE
FISHERIES OF DISTRICT No. 2, NEW BRUNSWICK, FOR 1918.

There was an increase in the catch of salmon, and an increase in its value. The destruction of salmon by seals still continues at the mouth of the Miramichi river and bay. The run of parent salmon in the Miramichi river was greater than ever, and with the assistance of the hatcheries we have reason to believe that this fishery will hold its own. The regulations were well enforced and the patrol steamer *Hudson* did good work keeping those using drift nets outside the three-mile limit.

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I regret to report a serious falling off in the lobster fishery. The southern part of my district showed a greater falling off than the northern section. The second season in 1917 contributed in some measure, at least, to the falling off in 1918. As the southern district is now changed from June to August, thus making a close season of all July and part of August, it will, in my opinion, assist very much in saving the lobsters that come into shoal water and are not more than half full of meat during July and August. Another very important matter is the saving of the female lobster. The licensing of fishermen, the co-operation of the canners, whose sympathy we are gaining, and the strict enforcement of the regulations will assist in this fishery being saved. The regulations were more strictly enforced than in previous years. The canners who have large investments in this fishery realize that it is necessary for them to give all the assistance possible to the officers. With that assistance there may be some hope of this fishery regaining its former importance.

There was a large falling off in the catch of cod, haddock and hake, but owing to increased prices the decrease in value is small. The unfavourable weather conditions in the early part of the season is given by the fishermen as the cause for the decrease in catch.

There was a considerable increase in the herring fishery, both in quantity and value. This fishery is becoming important. There are still large quantities used as fertilizer, but fishermen are taking advantage of the increased market value and are giving their attention to salting these fish, which a few years ago were regarded as only fit for bait or fertilizing purposes.

There is a small decrease in the mackerel catch, in comparison with last season, which was largely due to weather conditions.

The smelt fishery has more than held its own. The market value to the end of December was good, but during January and February of 1919 it fell off 50 per cent. The fishermen during the year received extra high prices. This was a great boon to them at a season of the year when employment is not easily procured.

There was practically no fishing for bass on the northwest and southwest Miramichi river, which are the principal bass fishing districts in the winter season. The residents of these districts find it more to their advantage to engage in lumbering operations.

There was an increase in the catch and value of oysters, as compared to last year.

The following is a return of the various kinds of licenses issued in my district during the fiscal year:—

Salmon fishery licenses.....	429
Oyster fishery licenses.....	300
Oyster permits.....	41
Herring weir licenses.....	14
Smelt bag-net licenses.....	2,931
" " " free.....	25
" gillnet licenses.....	118
Bass gillnet licenses.....	53
" fishery licenses.....	23
Lobster packing licenses.....	174
" additional licenses.....	7
Quahaug fishery licenses.....	37
Fish cannery licenses.....	1
Lobster pound.....	1

REPORT OF INSPECTOR H. E. HARRISON, FREDERICTON, N.B., ON THE FISHERIES OF DISTRICT No. 3, NEW BRUNSWICK, FOR 1918.

Without consuming a large part of my time and incurring a very large expense in the operation, by personal inquiry amongst the fishermen and special guardians, as opportunity offered, by correspondence with the fishermen and through the local

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officers, I have collected as nearly correct information of the catch as it seems possible to get. The following comparative statement shows a greatly reduced catch, but without a correspondingly reduced financial return to the fishermen, apart from the fact that the fishermen were required to pay a very greatly increased price for materials needed in their work, such as nets, boats and salt.

	Fish. (cwt.)	Value (boatside).	Value (marketed).	Value Materials.
1917.....	8,020	Not stated	\$45,622	\$50,074
1918.....	4,288 (approximate)	\$37,088	45,997	57,505

The total reduced catch amounts to well up to 50 per cent, confined very largely to two classes of fish: viz., shad and alewives.

Because of the closed period against taking shad—of which there were 1,148 cwts. taken in 1917—a considerable portion of the reduction is accounted for. The greater part of the balance of the reduced catch was caused by alewives failing to swarm in these waters, as they have for many years.

The very satisfactory and, in many instances, greatly increased prices received by the fishermen for those sold, and the increased value of those consumed by the fishermen themselves, thereby permitting them to dispose of very high-priced meats, gave the fisher folk very satisfactory financial returns. The order forbidding the taking of shad for four years struck our fishermen like a thunderbolt and was only little less of a shock to the consumers. Unaware of what was contemplated some of the fishermen had purchased new nets, beside all the old nets that were on hand—many of which will be of little value at the end of the closed period—and they felt somewhat aggrieved. We can only hope that shad will so multiply during the closed period that the public will see the wisdom of the step taken. If shad are given as good protection in the Atlantic Coast waters, on the United States side, as we are trying to give them in the harbours and St. John River waters, we should see a vast increase when the ban is again lifted. Otherwise, if we are protecting them and our friends to the south are getting the benefit of that protection, there will be another story. There was great disappointment among the alewives fishermen last spring. For some unaccountable cause the usual great quantities of this fish did not strike the inland waters of the St. John River system. While the run was on they appeared to be as plentiful as in other years, but it lasted only a week or ten days, about half the usual time, and about half the usual quantity was taken. The very satisfactory price received by the fishermen partly made up for the diminished catches. We usually have a run of alewives about the first of June, in some districts locally called the "June" run, in other districts the designation "Blue Back" is given them because of the colouring of that part of the fish. They were reported to have been very plentiful last spring, but they are not much fished for, being very difficult to cure for shipping purposes, because of their very oily nature. Quantities are taken for local use and smoked or pickled, and are very good, being preferred by some to the others.

I was agreeably surprised regarding the catch of salmon when returns were received from the different sections of my district. Reports reaching me, during the fishing, were somewhat discouraging. While there was a considerable shrinkage, about 12 per cent, it was not nearly so large as I feared. Conditions did not appear to be at all favourable for the fishermen, but were very much so for the fish. Because of two or three summer freshets necessitating the removal of nets for periods of a week or more each time, the fish had good opportunities for reaching the spawning areas. This condition did not apply so much to the district of Kings county, because

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of the greater expanse of water there. Salmon were ten days to two weeks later than usual in reaching the inland waters. A somewhat curious fact was the very limited number of grilse, the proportion being very small, and the large proportion of large fish, 15 to 25 pounds each. Because of the run being later than usual several licensed fishermen did not put their nets out, finding, with the shortage of farm help, they had no time to rig up their stands and give fishing any attention. Others fished for periods of two to three weeks only; poor stands, scarcity and expense of nets, and rush of farm work being the causes. A new salmon net is good for only one year in the St. John River water, and some renew the bag or detachable end twice each year. Otherwise, salmon—and St. John River salmon are exceedingly active—break through and pass on, perhaps to become entangled in the next net. The run of salmon in the Southwest Miramichi river was fair, a very much greater proportion of grilse being taken than in the St. John River waters. Compared with previous late years, fly-surface fishing on the Tobique river was very satisfactory, 100 per cent better than in 1917 and but for certain conditions, high water and lumber running through the pools, it probably would have been better.

The catch of pickerel, from reports received, equalled that of the previous year. This is the only fish taken altogether in nets, that is, taken to some extent the year round and this fishery is not prosecuted very vigorously.

Eel fishing appears to be on the decline, fortunately, it appears to me, because of the fact that they destroy the spawn of many of our more valuable fishes and cause considerable loss and trouble to the salmon fishermen, likewise for the shad fishermen—when this fishery is allowed—where the nets are set stationary. There was a fair proportionate increase in the catch of sturgeon, over last year. A curious feature noted in the returns was, of three licensed fishermen one took nearly the whole catch. These are all experienced fishermen and have used about the same stands year after year. It is not a case of one shutting out another, because the river is very broad where this fish is taken and such would be impossible with their short nets. A strange thing was that practically no spawn was taken in these fish; two of the men saying that they did not get any and the third that he got only 20 pounds in all his fish.

The very small number of applicants for whitefish (Baker lake) licenses caused me to wonder after these people had requested the Government to grant them this privilege, so I asked the local fishery guardian the cause. He stated that most of the nets owned by the fishermen were of an illegal size mesh, and that they knew they would be liable to seizure and confiscation, even if fished under license. Therefore, they did not take out licenses but took chances, with unhappy results in many cases. Judging by the number of nets seized and the size of the meshes of same, there appears to be good ground for the reasoning of the guardian. When I returned to the town of Edmundston I called upon the dealer who supplies the fishermen with most of the nets they use in Baker lake and asked him to purchase only three-inch mesh nets to supply these men with, in future, explaining to him the trouble we were having over the smaller mesh nets, and he promised to do so. I did not feel that I was interfering with his trade, as I felt that if they could not get the smaller nets they would just as readily buy the three-inch size, which is legal size.

From some sections of my district trout fishing was reported as not so good as in the previous year. This was noticeable in the northern districts and probably was due to an excessive amount of rain, which kept the brooks very full of water. The southern districts reported this fishery good as usual. Trout is an important article of diet to the people living by or near trout streams, in the open season. Frozen trout is retailing here (Fredericton, January, 1919) at 28 cents per pound.

Many sport fishermen, native and foreign, visit the subdistricts during the fishing seasons; several have expensive cottages, particularly about the shores of the lakes of the south subdistrict, and spend their holidays and week-ends there.

I have not any local officers (overseers) in the districts of Kings, Carleton, and Madawaska counties nor in the subdistricts of Victoria county. My general report about covers conditions in these districts, excepting that I wish to note the fact of the very materially decreased catch of salmon in the St. John river in Carleton county, and the satisfactory increase in the Tobique subdistrict of Victoria county, where it was 100 per cent better than in 1917. In Carleton the net fishermen were badly put about because of sudden and heavy raises of water. They were compelled to remove their nets for longer or shorter periods to avoid having them carried away. From the same cause the fly surface fishermen in the Tobique subdistrict were, to some extent, adversely affected, but they had the advantage of the summer freshets bringing the fish along faster than when the water is low. I beg to quote the report of the Superintendent of the Tobique Salmon Club, Thomas F. Allen (with his permission), dated October 12, 1918: "We took for our season's catch 244 salmon and 8 grilse. I would put the catch of other parties on this river at 150 salmon. There was a very small run of grilse this year, the smallest ever, to my knowledge. We have the largest number of spawning fish at the head waters that we have had for many years. They went up during the high water. Very few members visited the headwaters this season. The fish will be carefully guarded until they spawn and leave for the sea." The protection given by the above club must be of considerable benefit to the salmon fishermen (net) of the St. John river and harbour. Considerable fishing material was seized and confiscated during the season. Twenty-four shad nets, 12 salmon nets, and 40 whitefish nets were among the lot, besides wire netting (set to bar the ascent of fish in smaller rivers). 7 anchors, several salmon spears, also a small quantity of whitefish.

Nineteen cases covering various offences against the Fisheries Act, and one for assault upon the officers, were prosecuted before civil magistrates. Five of these escaped the punishment that was due them, for want of direct evidence. One escaped to the United States, after his guilt was proven. Fines were paid with costs in more offensive cases. Fines and costs to be collected in two cases not yet arranged, and four less offensive cases, after being proven and the costs paid, the sentences were permitted to stand, pending future good behaviour.

A word regarding the method of appointing special guardians. From protective and economical standpoints, there can be no question as to the superiority of the present method over that formerly in practice. It places more responsibility on the inspector and, in some instances, it is difficult to fulfil the responsibility as one would like doing. The proper sort of men cannot be had for efficient patrol, in some sections, and unless the wage is made an inducement—and it takes a large wage now—it is difficult to secure good patrolmen and move them from one section to another, unless promised a fairly long job, as it is at this season that men can get plenty of work near their own homes, at good wages. It is only from the country districts that men qualified for this work can be had, and there does not appear to be a surplus of men, of any quality, in the country districts at present. My staff of local officers, formerly eight in number, now consists of six, and are not well arranged. Formerly I had 74 special guardians, such as they were. Last season I had 34, which is 50 per cent less, and notwithstanding a substantial increase in wages a very substantial sum was saved over the previous years, and the service was not less efficient, I think, and the poachers concluded that we were, at least, as active as usual.

The following licenses were issued by me, for distribution throughout my district, during 1918:—

Salmon fishery licenses.. . . .	93
Salmon net fishing.. . . .	101
Sturgeon fishery.. . . .	3
Bass fishery.. . . .	9
Whitefish net fishing.. . . .	4

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REPORT OF INSPECTOR J. E. BERNIER, M.D., QUEBEC, ON THE SEA FISHERIES OF QUEBEC, FOR THE YEAR 1918.

Leaving Quebec on May 9, on board the *Princess*, the steamboat employed by the Dominion Government in the protection service in this district, I passed the entire summer cruising in the Gulf, without mishap except for the epidemic of influenza which swept over the entire district, with great severity, and carried off many victims. Fifteen members of our crew were attacked by the disease, beginning October 19, with the result that the vessel had to remain at Gaspé for three weeks. I reached Quebec on November 12.

During the entire season, an unaccustomed spirit of emulation and of interest in their work has prevailed among the fishermen, as a consequence of the high prices offered for fish, which had not been realized before. Thus, the general result, compared with that of the preceding year, shows an increase in value of about \$500,000. This must not be attributed, however, to increased quantities of fish, but rather to the fact that fish products have attained a higher price. In considering the general result, from this point of view, it is found that the catches of the past season have been more regular, but have not, on the whole, been better than those of the preceding year.

The conditions observed in the different sections of the Gulf Division are as follows:—

North coast and Labrador.—The most important fishery of this section is the cod fishery, which is carried on by means of hand-lines and “trap-nets.” The trap-net has been in general use for a long time on the Labrador coast; while on the north coast, between Natashquan and Pointe-des-Monts, it has continued unpopular. However, the experiences of the summer have been so encouraging that many fishermen show a desire to use this new method of fishing, in future.

The fishing commenced later, but once the cod had reached the coast, they remained until the close of the season; and the greater part of the time, were close to the shore. At Moisie, they were even taken in the mouth of the river; at Natashquan and other places, several hundredweights were taken in the salmon nets; at Sheldrake and at Godbout the fish were taken by means of hand-lines, from the rocks on shore. To the east of Pointe-des-Monts, Overseer Comeau reports that the fish were met with in “phenomenal” quantities, in schools at the surface of the water, as far as the mouth of the Saguenay. It is remarkable that the cod, which used to be taken in abundance in the neighbourhood of the Saguenay, but had practically gone away for forty or fifty years, are now observed there in ever more considerable quantities.

The weather continued favourable for all fishing operations, and it was always possible to procure a sufficient quantity of bait.

The result of the cod fishery, on the north coast and the Labrador, shows an increase over last year. The result would have been even better if the fishermen had been able to obtain, in time, all the salt they required. It is estimated that the quantity of cod which, for this reason they lost or neglected to take, was about 8,000 hundredweights.

The salmon net fishery was slight and backward. It shows a decrease of about 25 per cent from that of the previous season, which was itself far from being good. However, I do not believe that this fact augurs ill for the future, for very considerable quantities of reproducing salmon were noticed on the spawning grounds, in the fall, and in all the rivers. The failure seems to be due to a natural cause. As a result of the lack of rain, the water in the rivers remained low until July. The salmon only approached the rivers in the latter part of the month, and in the month following; that is, when the net fishery had been finished. In any event, the failure could not be attributed to poaching on the spawning grounds during preceding seasons, for it is universally recognized that the inhabitants of this coast do not engage therein as formerly, since they derive much greater benefit through applying themselves exclusively to the cod fishery.

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South coast (counties of Bonaventure, Gaspé and Rimouski).—In this district, cod is the most important fishery; salmon, lobsters and herring are regarded as secondary in importance.

The beginning of the cod season was at nearly the same time as in the preceding year, and the fishery was followed with success until the end of the season. Bait was sometimes scarce and difficult to obtain, but the fine catches which were made in September and October amply compensated for the scarcity of bait. The general result exceeded that of last year, from the point of view of value, but did not equal it in quantity.

The lobster fishery gave practically the same results as in 1917, notwithstanding that the season was shorter, and that a storm on June 12 destroyed about one-third of the traps, which could not be replaced. It was stated everywhere that the lobsters were plentiful and of great size.

In this section, as elsewhere, the salmon fishery continues to decrease, without it being possible to determine the cause with certainty.

The herring fishery was normal, and equalled that of last year.

Magdalen Islands.—In this district as much importance is attached to the lobster fishery as to the cod fishery. The fisheries for herring and mackerel occupy second place.

The lobster fishery was prosecuted under unfavourable circumstances, owing to the fact that storms destroyed a large number of traps, but it nevertheless gave a result considerably higher than that of the preceding season. The observations which were made show that it continues to be good, and, contrary to conditions elsewhere, has a tendency to increase, since fishing in the lagoons has been prohibited. This fact now attracts the attention of the majority of the fishermen, who, as a result of the educational campaign recently carried on, recognize that it is in their interest to refrain from illegal fishing, and even to help in preventing it. The coast has been carefully patrolled, and the law has been observed in a satisfactory manner.

The cod fishery shows a decrease of about 25 per cent, the sole cause of which is the unfavourable weather conditions. The mackerel fishery, for the same reason, gave only 50 per cent of the previous year's catch. Herring was caught in abundance, but owing to the limited number of foreign fishing vessels which visited the islands, it was only possible to sell a small quantity for the ordinary purpose that is, for bait. On the contrary, thanks to the high prices of the markets for two years past, the fishermen are using the herring in another way, and are smoking them. Several large smoke-houses have already been built, with this end in view, and this new industry tends to assume large proportions.

In the entire Gulf Division it is noticeable that the fishermen begin to show interest in the improvements and the development which it is sought to realize in everything concerning the sea fisheries. They show more attention and more activity in their work. At the same time, they manifest a disposition to abandon certain old methods, and to follow more modern processes, which they try to adapt to the conditions in which they find themselves. If left to themselves the slow evolution which is going on can only become apparent after years of groping, while the example of vessels, of apparatus, of superior methods of fishing, and also of a little practical instruction placed within their reach, would assist them to more quickly change their primitive ways of fishing, and would place them in a condition to better appreciate the advantages of the field which they exploit only imperfectly.

This need of knowledge is, perhaps, more marked in my district than in any other, on account of its extent, the difficulty of communication, the scattered population, and other causes growing out of these. It appears reasonable to believe that it is useless to expect this district to show a greatly increased production so long as this first need is not fulfilled.

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The following is a statement showing the number of licenses of the different kinds issued during the year:—

Lobster packing (lobster extensions, 14)	54
Herring trap-net	46
Cannery licenses (other than lobster)	3
Salmon fishery	158
Cod trap-net	329
	<hr/>
	590

REPORT OF INSPECTOR J. A. HOWELL, SELKIRK, MAN., ON THE FISHERIES OF DISTRICT No. 1, MANITOBA, FOR 1918.

The catch of fish in Lake Winnipeg during the summer was good. In fact, fishing had to be stopped before the end of the whitefish season as the fishermen had caught the quantity allotted them, which quantity was 500,000 pounds more than the season of 1917, which I think was partly due to the number of fish deposited in the lake from the hatcheries, also to the strict enforcement of the law. The total licenses issued during 1918 were 364 summer and 540 winter licenses.

I find there is a large decrease in the catch of pickerel this year, which I cannot account for, as there were as many fishermen working as last year. There is also a decrease in the tullibee catch. This can be accounted for by the open fall; the fishermen could not get their nets in the water during the time the fish were running, as there was no ice. When the lake was frozen hard enough to go on the fish were gone. This, I think, is partly the reason for the decrease in pickerel also.

Thanks are due the fish dealers and the fishermen for the assistance they gave me on the lake in protecting the different fishing grounds from being polluted by dead fish and offal, and also by adhering to the fishery regulations.

The following is a statement showing the number of licenses issued in my district during the 1918-19 season:—

Special fishery	904
Commercial sturgeon	49
Settlers' permits	37
	<hr/>
	990

REPORT OF INSPECTOR D. F. REID, WINNIPEG, MAN., ON THE FISHERIES OF DISTRICT No. 2, FOR 1918.

Fishing during the year, on the whole, was about the same as last year, except sturgeon fishing which shows a slight falling off due to the high price of twine, which caused the fishermen to resort to baited hook fishing. There was a slightly decreased aggregate of all kinds of fish, but a considerable increase in value as a result of higher prices paid for all kinds. During the year there were 406 Settlers' Permits issued in my district, as compared with 168 last year.

I am pleased to state that the limit of catch placed on most of the lakes in my district has been well adhered to, and evidently gives satisfaction as it prevents overcrowding. We had a very late freeze-up last fall, and in some parts of my district fishing was an almost complete failure, but on account of many more licenses being issued it can be averaged as a fairly good year.

I have had only twelve prosecutions in my district during the year; of these, nine were convicted and fined various amounts, three were not proven. I have had assisting me during the year two overseers and two guardians.

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before any fishing was done there could hardly have been time to give these lakes the necessary exploration by the fishermen, which is needed before operations can be successful.

The following is a statement of the number of licenses issued during the season 1918-19:—

Special fishery.. . . .	1,369
Commercial sturgeon.. . . .	32
Settlers' permits.. . . .	406
	<hr/>
	1,807

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, INDIAN HEAD, SASK., ON THE FISHERIES OF SASKATCHEWAN AND ALBERTA, FOR 1918.

A comparison of this year's figures with those for 1917 would lead to the opinion that this year's operations had fallen off in practically every respect. This, however, is not the case, this season's figures being only for commercial operations, whereas those for 1917 included the operations carried on under Domestic Licenses and Indian and Half-breed Permits. A study of this year's figures covering only commercial operations will show that the catch for commercial purposes only, is very little less than the catch for 1917 which included the total catch for all purposes.

The good reports from all districts of Northern Saskatchewan are very gratifying and show that the fisheries are proving to be a profitable source of revenue to those who are going into the fishing business on a large scale and are instrumental in opening up these large waters for fishing purposes.

In Southern Saskatchewan the operations are on a much smaller scale, Lowes Lake, the Qu'Appelle lakes and Katepwe Lake being the waters fished commercially. The catch in these waters shows very little increase from year to year, this being due to the fact that practically the same fishermen operate each year, few newcomers taking up fishing as a means of livelihood. During the past four years the Qu'Appelle lakes have been fished with nets of four and one half inch mesh in order to as far as possible get rid of the pike and tullibee. This, from reports, so far as pike are concerned, appears to have been successful. The tullibee do not appear to have been got rid of to any very great extent. Large quantities of whitefish fry have been placed in these lakes each year during the above period, and those which were planted at the first are now maturing. The fry were furnished from the Qu'Appelle fish hatchery and the work has been a great success. Whitefish fry were also planted in the Strawberry Lakes during the past year and, from the last reports received, are thriving.

In Saskatchewan a large increase in the number of prosecutions for illegal fishing is observed. During 1917 only five prosecutions were made; during 1918 there were no less than thirty-two. In every case a conviction was secured and a fine inflicted. But in some instances where the cases were tried before the local Justices of the Peace the fines imposed were somewhat inadequate to the offences.

Weather conditions throughout the province have this winter been ideal for winter fishing, and this no doubt has had a great deal to do with the good showing of the Saskatchewan fisheries. The epidemic of influenza hit the fishermen, both in Saskatchewan and Alberta, very hard, and many deaths occurred. Even with this handicap it may safely be said that the fisheries have gone ahead greatly since last year and give promise of even greater extension next year.

In the province of Alberta the closing of Lesser Slave Lake and Lac la Biche to winter commercial fishing, while not popular with a certain section of the fishermen, gave these lakes a much needed rest, and caused the fishermen and fish companies to look elsewhere for their fish. This led to the opening up of a number of lakes lying to the north of Lesser Slave Lake, to reach which it was necessary in some cases to cut roads in to the proposed fishing grounds. Reports from these lakes are to the effect that the operations have not been generally successful; but as it was late in the season

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cessful. Therefore, it is somewhat too early to definitely state that these lakes cannot be fished profitably. It would take at least two season's fishing to learn what might reasonably be expected from them. I am of the opinion that the present rules in force in connection with fishing at Lesser Slave Lake are the best we have had to date and could with advantage be kept in force during the season 1919.

A new fishery was opened at Buffalo Lake, situated in the province of Saskatchewan, and it was at first thought that it could be handled to the best advantage from the Saskatchewan side. Orders were issued that applications should be made through the Inspector of Fisheries for Saskatchewan, and that only those eligible for Saskatchewan licenses should be granted licenses. It was later found that the catch would all have to be shipped out from a point of the Alberta and Great Waterways Railway, in the province of Alberta. Thereupon this lake was, for the present season, placed under the administration of the Alberta inspector for northern Alberta, with the provision that applicants from both the provinces of Alberta and Saskatchewan were to be granted licenses, and that the waters were open to all for fishing purposes. To reach this lake it was necessary to cut a road for some eighty miles from the shipping point to the lake. This work was started late and for a time was at a standstill owing to the road gangs being all laid up with influenza. Owing to the late start of operations it has not been possible to get any accurate report of the catch from this lake, as none of it had been brought out when the year ended. Acting Inspector W. H. Bell is under instructions to make a personal trip to Buffalo Lake, for the purpose of looking into the operations and seeing that the regulations are being observed and that the fishing ceases on the proper date. This district will be fully reported on in my next year's report. I am under the impression that it will show that there is a very successful new fishery in operation.

In the province of Alberta twenty-eight prosecutions were made, as compared with twenty-five the previous year. This is, however, not an indication that there was not more illegal fishing, as many seizures of excess and illegal gear were made, especially in Lesser Slave Lake, for which no owners could be found. I may mention that in one case no less than eleven hundred yards of net were seized; it was weighted so that it was concealed below the water; it was found by dragging operations. Though at the present price of nets, eleven hundred yards is worth considerable money, no person came forward to claim it.

Experiments were made at Lesser Slave Lake with a pound net, to find out if it was possible to clear out the pike without danger to the whitefish. It was found out that this could not be done, and the experiment was stopped. A similar attempt at Lac la Biche, where a drag net was used, was a success; large quantities of pike being taken.

During the past year the Canada Food Board set prices for fish and made several orders, all of which worked out well in practice. The object of sufficiently providing for the home demand for fish of all kinds before the export of fish was allowed, has certainly worked out in the case of Alberta and Saskatchewan. Such assistance as was needed by the officers of the Canada Food Board from our fishery officers and guardians was given; the work between our men and the Canada Food Board being done in a most harmonious manner.

The following is a statement showing the number of licenses of the different kinds, issued in each province during the 1918-19 season:—

<i>Saskatchewan.</i>	
Commercial and fisherman's	813
Commercial Sturgeon	6
Domestic sturgeon	14
Domestic fishery	213
Indian and Half-breed permits	653
Special angling permits	15
	<hr/>
	1,744
	<hr/>

Alberta.

Indian and Half-breed.. . . .	267
Commercial and fisherman's.. . . .	986
Domestic fishery.. . . .	204
Cannery.. . . .	1
Special angling permits.. . . .	4,338
	<hr/> 5,796

I am glad to be able to conclude this report by stating that the past year has been the most successful yet reported on.

REPORT OF CHIEF INSPECTOR F. H. CUNNINGHAM, VANCOUVER, B.C.,
ON THE FISHERIES OF BRITISH COLUMBIA FOR 1918.

The condition of the fishing industry as a whole may be considered satisfactory, although in some sections there was a falling off in the run of sockeye, notably in Rivers Inlet. It is not possible to give any specific reasons for the decrease of this variety in this particular area, especially as so little is known of the life history of the sockeye after they go out to sea as fry or fingerlings. There has been no increased fishing in this area since 1910, seven hundred boats being the allotment, and the hatchery on Owekano Lake has turned out its usual quota of fry yearly up to 1918, in which year the collection of eggs was considerably reduced.

Some of the spawning streams are partially obstructed to the ascent of parent fish to their spawning grounds, but the removal of the obstructions is receiving attention, and the run of 1919 will have free access to the natural spawning grounds.

There was an increased run of both sockeye and spring salmon on the Skeena River; the run of the latter species being a very agreeable surprise, as it was feared that these were on the down grade. Fortunately, however, the fish appeared as abundantly as in 1912-13, notwithstanding the added tax which was put on this species by the more extensive trolling operations.

Pinks and chums were good all over the province. Climatic conditions were good; prices paid to the fishermen were increased, and so far as the actual fishing operations were concerned the salmon fishing industry as a whole may be considered as having been very successful.

The marketing of the finished article, owing to the war conditions of last fall, was not satisfactory. The greater proportion of red salmon, including pinks, was commandeered by the Government. Chums were not included and, as a consequence, there are unsold in the province, at the present time (June 1919), probably 250,000 cases. It is hoped, however, that with Peace terms signed and with the return of normal conditions an opportunity will offer for the disposition of this stock.

The fishing for chum salmon on the west coast of Vancouver Island, in the area from Cape Beale to Sombrio Point, was most successful. Practically half the catch was exported to the United States, where it was canned and ultimately marketed in the southern states. The exportation of so much raw material from the province has been the subject of serious consideration, and there is much to be said both in favour of and against exportation. Those in favour of continued exportation point to the fact that the price received by the producers is greater than that which they would receive if they only had the home market in which to dispose of their catch. Those opposed to exportation point out that they are unable to pack and successfully compete in the southern markets owing to the duty of 15 per cent. On canned goods exported to the United States. Again, traps and seines are much in vogue in the United States for all varieties of salmon, hence the better varieties are caught just as cheaply as other grades. This enables the American packer to pay a higher price for the raw product of the lower grades than the Canadian packer can afford to pay.

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This question was taken up fully by the Fisheries Commission of 1917, and it was recommended by them that exportation should be allowed to continue. It is, however, in the opinion of the undersigned, a trade worthy of further investigation, as it is certainly in the interests of this country that its raw material should be manufactured at home.

The run of salmon to the Fraser river was, for even an off season, very poor. It is hoped that the work of the International Fisheries Commission will result in regulations which will assist nature in bringing back this fine salmon river to its normal state of production. It is felt that this work would be greatly assisted if, when the parent salmon ascending the streams of the Fraser river watershed had passed the commercial fishing boundary, they were allowed to ascend to their natural spawning grounds without any molestation whatever, either by Indians or others. Arrangements should be made to supply the Indians with fish food from the commercial run before the fish pass out of the commercial area. If this were done there is no doubt that a great improvement could reasonably be expected.

Trolling for salmon as a commercial pursuit is gradually increasing. It gives the fisherman with limited capital an opportunity of entering the fishing industry on his own account, in a legitimate manner. The outlay is small and the returns are good. Some operators last season made from two to three thousand dollars. Spring salmon brought eight and nine cents per pound, and as high as 65 cents per fish was paid for coho. Of course, green hands could not expect to take up this phase of the fishing business and make such a complete success of it at the start. Like everything else, it needs experience, but it is an easy and legitimate way of fishing, and should offer good opportunities for returned soldiers whose condition calls for an outdoor life.

The favourite trolling grounds are around Langara Island, Dundas Island and Wark Canal, and on the west coast of Vancouver Island off Clayoquot and Barclay sounds, but there are other districts with more sheltered waters where trolling can be carried on remuneratively.

HERRING.

The catch of herring shows an increase. Unfortunately, however, market conditions, following the signing of the armistice, were greatly changed. During the war the Canadian trade with the United States and Australia improved greatly owing to the lack of European supplies. This drew a number of inexperienced packers into the trade during the winter season of 1917-18, with the result that a large proportion of the output was badly cured. With the ending of hostilities and the expected immediate resumption of trading in herring with Europe, the demand for Canadian herring fell off in the United States and much of the poorly packed fish remained unsold.

WHALES.

The whaling industry of 1918 was most successful. For the first time in the history of this industry in Canada whale meat was canned, nearly 30,000 cases being put up, and the commodity has found a ready market.

HALIBUT.

The catch of halibut during 1918 was up to the normal average, and ranged in price from 15 cents to 20 cents per pound. Seven hundred and seventy-five cars of this species left Prince Rupert over the Grand Trunk Pacific Railway during the year.

There were the same complaints during the season of scarcity of bait, but two or three attempts were made by individuals to establish retaining ponds for herring which could be sold fresh as bait to the halibut fishermen. Reports indicate that this has proved successful and it will no doubt tend in a certain measure to relieve the situation.

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REMOVAL OF OBSTRUCTIONS.

Whilst some work was done during 1918 in this direction, it was limited owing to the scarcity of labour and the desire to minimize expenditure as much as possible during the war period. Now that this necessity has been removed, the season of 1919 will end, it is hoped, with access to important and valuable spawning areas being freed to the spawning fish.

FISH BREEDING.

The usual fish hatcheries were in operation during the season, and were successfully conducted. The number of eggs obtainable depends entirely upon whether the run of parent fish is large or small. To a small run, therefore, must be attributed the small number of eggs collected in the Rivers Inlet district this year. Operations at the other hatcheries were normal, and the reports from the officers in charge are to the effect that the spawning beds were well seeded.

GENERAL REMARKS.

The war has affected the fishing industry in common with the commercial life of the country generally, and its close has brought many changes in pre-war conditions. Previous to 1914 there was little or no demand for canned pink or chum salmon. But with a world-wide food scarcity these varieties jumped into prominence, and they were easily disposed of. This increased demand induced those who were in the canning business to extend their operations in the canning of fall fish. It also induced others to participate in the industry. Consequently, the whole coast line of British Columbia is covered by licenses, and those now desiring to take up the fishing business as a means of earning a livelihood find that a location for a fishing area is very difficult to obtain.

To the returned soldier the fishing business appears to be very fascinating, for even before the fishing season of 1918 was closed applications for seining licenses for the season of 1919 were received from returned men. At the close of the year the applications had increased to an unexpected number and as under the existing licensing system only a limited number of seining licenses could be granted, the question of dealing with the increase was a serious matter. It must be remembered that the arrangements for the fishing season of 1919 would be made as early as the previous fall. This condition made it a most difficult matter to deal with the applications from returned soldiers without disturbing the whole producing life of the industry.

I am desirous of leading up to the question as to whether the time has not arrived when consideration should be given to a new policy covering the issuing of fishing licenses. At present a salmon purse-seine license covers a certain area, and the amount of fishing in that particular area will depend on the run of fish. If the run is large a number of fish can be caught without injuring the spawning grounds, but if the run is small intensive fishing takes place to the great detriment of the spawning grounds, as the operator feels the result of his operations must be equal to a fair return for the money invested. Are these restricted areas, therefore, in the interests of conservation? I have reached the conclusion, after mature deliberation, that they are not and that it would be in the interests of conservation and in accord with public opinion if these areas were largely increased and a number of licenses issued for the greater area over which all the licenses for that particular area would have the privilege of operating.

This is a suggestion, and consideration of the question might even tend in the direction of larger areas than is being considered at the moment. It appears to me that extended areas would be in the interests of conservation, as certain streams in the areas which show depletion would be benefited by the location of a proper fishing boundary without in any way interfering or limiting any one licensee's opera-

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tions as he would have all other portions of the area in which to operate, and the weekly close season would be based on the extent of the fishing operations carried on in the locality affected.

The number of licenses issued during the season of 1918 was as follows:—

Salmon cannery.....	92
“ drag-seine.....	127
“ purse-seine.....	122
“ trap-net.....	24
“ trolling.....	1,786
“ gillnet.....	5,074
Herring purse-seine.....	62
“ drag-seine.....	5
“ gillnet.....	256
“ trap-net.....	1
Abalone.....	1
Sardine and smelt.....	62
Miscellaneous cannery.....	18
“ licenses.....	340
Sturgeon.....	5
Crab.....	32
Angling permits.....	33
Reduction works.....	11

I am pleased to say that the district inspectors and fishery officers have carried out their duties in a faithful and painstaking manner, and the fishery regulations have been satisfactorily enforced. The headquarters staff have had a very busy year, and have all performed their duties in an efficient manner.

YUKON TERRITORY.

Special fishery licenses.....	30
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APPENDIX 2.

The following is a statement showing the number of prosecutions, confiscations and sales, which took place in each province, during the 1918-19 season:—

	Prosecutions.	Revenue from Sales.	
Quebec.....	7	\$ 67 50	—
Prince Edward Island.....	30	254 10	\$ 193 00
Nova Scotia—			
District No. 1.....	5	75 00	1 50
“ No. 2.....	31	437 76	19 80
“ No. 3.....	23	90 50	38 05
New Brunswick—			
District No. 1.....	7	460 00	90 48
“ No. 2.....	29	425 00	1,859 39
“ No. 3.....	18	177 70	46 85
Manitoba—			
District No. 1.....	11	125 00	41 20
“ No. 2.....	32	183 00	337 83
Saskatchewan.....	30	198 85	467 90
Alberta.....			
British Columbia—			
District No. 1.....	41	311 50	2,136 35
“ No. 2.....	35	1,102 00	131 79
“ No. 3.....	19	1,275 00	1586 39
Yukon Territory.....			—
Total.....	318	\$5,182 91	\$6,950 53

APPENDIX 3.

REPORT ON DRIFT NET FISHING OPERATIONS OF STEAMER
THIRTY-THREE, 1918.

By J. J. COWIE.

Having been directed to fit out the steamer *Thirty-three* with drift nets, and send her to sea for the purpose of carrying on fishing operations for mackerel and herring during the summer of 1918, I now beg to report the results thereof.

In view of the quantities of mackerel taken in the few mackerel nets carried by the steamer during the month of June, 1916, it was decided to begin the season of 1918 by operating a full fleet of mackerel nets. The difficulty experienced by manufacturers in securing net-making material, however, owing to war conditions, made it impossible to get as many of these as were necessary. Between Boston and Gloucester, Mass., and Halifax, N.S., not more than half of a full fleet for a steam drifter could be secured.

The carrying out of some repairs in the engine-room kept the steamer in port till June 1, on which date she first sailed for the fishing grounds.

As in 1916, the vessel carried a crew of eight, including the captain, each of whom was called upon to help in operating the fishing gear.

The fish were sold in the port nearest to the fishing ground on which the vessel happened to be operating, and where buyers were found prepared to handle them. A receipt for the quantity bought by each buyer on each occasion, was duly signed and forwarded by the captain of the vessel to the chief accountant of the department, who in turn collected from the buyers the amount due.

My other official duties prevented me from being at the landing places of the steamer, and superintending the actual fishing operations therefrom. As far as it was possible to do so, general direction was given to the work by telegram or letter from Ottawa. It is somewhat difficult, however, to maintain close or regular communication with a fishing vessel mostly at sea in the night time, and at this port to-day and that to-morrow in the daytime. Consequently, the matter of deciding where and when to set the nets had, of necessity, to be left mainly to the man on the spot—the captain of the vessel—who, in any case, was in the best position to judge as to the movements of the fish.

The evidence afforded in 1916 that a successful drift net-fishery could be carried on when mackerel are moving eastward, along the coast of Nova Scotia, in spring or early summer, has been made clearer and more definite by the operations of 1918.

Ranging from about 25 miles southwest of Canso to 15 miles east of that place, thirty thousand pounds were taken at three hauls. That quantity should have been quadrupled with ease while the mass of fish was in the vicinity of Canso, but for apparent difficulty on the part of the crew in handling the fishing gear. On the first night at sea, the nets were set amongst what appeared to be a large body of fish. In setting, however, the twine was allowed to become twisted around the hawser, which put the nets entirely out of fishing condition that night, and caused the loss of valuable time unravelling them. The considerable catch secured on the third night at sea again caused loss of time clearing fouled gear and repairing torn nets. Later on, the gear was handled in a more efficient manner, but the chances of securing large quantities had become less with the breaking up and scattering of the main body of fish.

On June 18 the steamer passed through the Bras d'Or lakes to a position ten miles northeast of Sydney, in an effort to keep in touch with the moving fish. The nets were set there on the 18th, and at a point six miles of Ingonish on the 19th, and again, at a point 35 miles west of cape North on the 20th. The small quantities taken on each occasion would indicate that the big school had passed around cape North and into the gulf ahead of the steamer.

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Early in July, the mackerel nets were put ashore, and herring nets taken on board at Halifax to replace them. It was then decided by the captain to return direct to the gulf waters, without waiting to make a set off the coast of Halifax county, where he caught considerable quantities of herring in 1916. On the 16th of July a set was made midway between Cape George and Port Hood, but no herring were taken. On the night of the 17th what appeared to be a large body of fish was struck 11 miles northwest of Port Hood, where a catch of 40 barrels was secured. On the night of the 18th, at the same place, a haul of 60 barrels was made. These fish were of fine quality and in excellent condition for curing, kippering, or freezing for food purposes. On the following night, the nets were set at the same place, but not more than two barrels of herring, of inferior quality, were caught; thus indicating that the herring had moved away from that spot. Attempts were made later to get in touch with the school in that locality, but without success. Had there been half a dozen drifters at work nightly, instead of one, at as many different points between Prince Edward Island and Cape Breton, I am confident that contact with the main body of the fish would have been maintained all through July and August.

Keeping in mind the fact that this drifter caught 264 barrels of fat herring midway between the Magdalen Islands and Cheticamp, Cape Breton, from the 6th to the 20th of July, 1907, also that three fairly good catches were made between Cape George and Port Hood in July, 1915, when the vessel was under Dr. Hjort's direction, and further that the best catch of the season of 1916 was made in this same locality, it seems clear that a large body of herring of fine quality is to be found annually in that part of the Gulf waters, extending from Antigonish county northwards to the Magdalen Islands; and there can be no doubt that a small fleet of drifters, which need not be steamers, operating there could establish a regular summer herring fishery. It is exceptionally well suited for the prosecution of such a fishery. It is sheltered on three sides, and there are several good and conveniently situated harbours—such as Murray Harbour, Georgetown and Souris on the one hand, and Port Hood, Grand Etang and Cheticamp on the other. Moreover, it is practically free from the fogs that are prevalent on the open Atlantic coast.

At the end of the first week in August, the captain was ordered to operate in the Bay Chaleur, from Shippegan, N.B., but after two or three unsuccessful sets he returned to the waters between Prince Edward Island and Inverness county, Nova Scotia. Several hundred pounds of mackerel only were taken during August.

It is rather remarkable that herring of good quality and still full of milt or roe, were taken near Cape George, Antigonish county, as late as September 24.

In judging the results of the operations, it should be remembered that both herring and mackerel are seasonal fish, and can only be taken in quantities at certain places and at certain times of the year. Moreover, a single steam drifter, no matter how energetic and competent the master and crew may be, cannot be expected to sail out to a certain fishing ground and return with fish, in either large or small quantities, on each occasion, like a steam trawler. The drifter goes out after fish that are on the move always, near the surface of the water; whereas, the trawler operates for fish that are, comparatively speaking, stationary near the bottom, and which can be taken in more or less considerable quantities the whole year round.

A share of the gross earnings was allowed for distribution amongst the crew, as an inducement to prosecute the work with vigour and secure fish in quantities. Notwithstanding this, and after making due allowance for the erratic movements of the fish, the crew's incomplete knowledge of this method of fishing, and the discouraging effect of frequently hauling empty gear, it would seem that the operations were not pushed as vigorously as they should have been, after the month of July, especially. This may have been due, in some measure, to the presence of German submarines off the south coast of Nova Scotia.

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It would not be advisable, in my opinion, to continue the use of this vessel as a drifter. Her continuance, alone, at this work will add little to the knowledge we now have of the whereabouts of the herring schools, and the catching and landing of herring regularly and in paying quantities is no more likely to be accomplished on this side of the Atlantic than on the other by a single boat, even with the most efficient kind of crew on board. Success may be assured only by a fleet of several drifters, not necessarily expensive steam vessels, working together—the one acting as a guide to the other in locating and keeping in touch with the moving fish.

When the time is ripe and trade conditions warrant it, private enterprise will, no doubt, be found ready to create such fleets by converting some of the smaller gasoline codfishing vessels into herring drifters, for use as such during the summer herring fishing seasons.

FIFTY-THIRD
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of the Naval Service

FOR THE YEAR

1919

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
THOMAS MULVEY
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1920

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-third annual report of the Fisheries Branch of the Department of the Naval Service.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

Minister of the Naval Service.

DEPARTMENT OF THE NAVAL SERVICE,

OTTAWA, June, 1920.

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DEPUTY MINISTER'S REPORT.

To the Hon. C. C. BALLANTYNE,
Minister of the Naval Service.

SIR,—I have the honour to submit the fifty-third annual report of the Fisheries Branch of the Department of the Naval Service, which deals with:—

- (a) International questions;
- (b) The various activities of the branch;
- (c) Proposed new activities;
- (d) Reorganization of the Outside Service;
- (e) The fishing operations of the year 1919.

Appendices to this report include the following:—

- 1. Reports of Inspectors of Fisheries.
- 2. Natural History Report.
- 3. Entries in Canadian Ports by United States Fishing Vessels.
- 4. Fisheries Expenditure and Revenue.
- 5. Summary of Prosecutions, Confiscations and Sales.

INTERNATIONAL QUESTIONS.

While the oceans are commercially regarded as the great dividers of nations, from a fisheries standpoint they form the meeting grounds of the nations of the world. Hence from the earliest time, the fisheries have been a fruitful source of international problems, and in all probability, they always will be so.

FISHERIES COMMISSION.

The work of the International Fisheries Commission, which was appointed in 1918 to consider a settlement of outstanding fishery questions between Canada and the United States, was explained in my report of last year. Substantial progress has been made following consideration of the report of the commission by the two Governments. On the 2nd of September last a treaty was signed at Washington for the joint protection, preservation and propagation of the sockeye salmon fishery of the Fraser River system. When this treaty was under consideration by the United States Senate with a view to ratification, it was discovered that under the wording of the final sentence of article 2 thereof, a person who had been tried and acquitted for an offence against the regulations in one country, if he subsequently went to the other, could again be tried for the same offence. As such a possibility is seriously objectionable, it was decided by the President of the United States to withdraw the treaty from the Senate for re-negotiation of this article. The amending article has been practically agreed upon and it is anticipated that the treaty will be ratified during the coming year.

Negotiations have also been proceeding towards the settlement of a number of questions regarding privileges, etc., of the fishing vessels of one country when visiting the ports of the other. These are matters which have been the cause of friction between the two countries ever since there was a United States. It will be remembered that they were temporarily settled by authority of an order of the United States Secretary of Commerce, issued by authority of the President, on the 21st of February, 1918, so far as the United States are concerned, and by an Order in Council of the 8th of March of that year, so far as Canada is concerned. The provisions of these arrangements are being maintained pending the outcome of the negotiations for a more permanent arrangement.

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PELAGIC SEALING TREATY.

The Pelagic Sealing Treaty, which was signed on July 7, 1911, is demonstrating its efficiency from all standpoints. Following the ratification of the treaty, all commercial killing was prohibited on the United States and Russian islands for a period of five years, so that commercial killing, which was carried on to a small extent in 1912 before the close season became effective, did not again begin on the United States islands till the latter part of the season of 1917, and on the Russian islands until the season of that year. Under the treaty, Canada received from the United States an advanced payment of \$200,000 and \$10,000 a year for five years covered by the close season. These advanced payments have, however, to be recouped by the retention of a sufficient share of the skins that would otherwise come to Canada. Canada receives 15 per cent of the skins taken on the United States and Russian islands and 10 per cent of the skins taken on the Japanese islands. The total number of skins taken on the different islands for commercial purposes has been as follows:—

Year.	United States Islands.	Russian Islands.	Japanese Islands.
1912.....	3,764	nil.	139
1913.....	nil.	"	547
1914.....	"	"	537
1915.....	"	"	571
1916.....	"	"	nil.
1917.....	1,831	806	"
1918.....	34,890	no record.	550
1919.....	27,821	636	555

An accounting has not yet been completed with the United States, but keeping in view the prices at which the seal skins sold up to and including the sale of February last, and on the assumption that similar prices will be obtained for the skins that are still on hand, Canada will receive, for her share of the skins taken up to the end of 1919, after recouping the United States for the advanced payments, well over \$800,000 from that country, in addition to over \$30,000, for the unsold skins received from the Russian and Japanese islands.

DEPARTMENTAL ACTIVITIES.

The year 1919-20 has been a busy one in the life of the Fisheries Branch, and has also been one of great importance; as measures—consideration of which had to remain in abeyance during the war—were effected, which clear the way for further action towards the encouragement of proper and speedy development of our fisheries.

The activities of the branch during the year, in the direction of the conservation, propagation, and increased commercial development of our fishery resources, and the maintenance of a high standard of quality in Canadian fish products, comprised the following:—

- Educational campaign among lobster fishermen and packers.
- Control and protection of fisheries,
- Fisheries patrol service,
- Publicity and Transportation Division,
- Investigations at biological stations,
- Natural history investigations,
- Fish culture,
- Oyster culture,

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Fish inspection,
 Inspection of canneries and canned fish,
 Drift-net fishing operations,
 Bait-reporting service,
 Fisheries statistics,
 Fishing bounties.

EDUCATIONAL CAMPAIGN AMONGST LOBSTER FISHERMEN AND PACKERS.

This work was begun in 1918 and proved so useful that it was resumed this year. The campaign was under the personal direction of Doctor A. P. Knight, of Queen's University, who has been, for some years past, engaging in investigations into the natural history of the lobster. Doctor Knight organized the campaign for the season of 1919, but shortly before the work began he became ill, and unfortunately was unable to take further active part in it.

The campaign was carried on mainly during the spring lobster fishing seasons. Those engaging in it and the districts in which they were working were:—

1. Mr. Andrew Halkett, Naturalist of the department—Southern New Brunswick and a portion of the southern coast of Nova Scotia.
2. Rev. Doctor Macgillvary, of Kingston—Western Nova Scotia.
3. Professor C. J. Connolly, of St. Francis Xavier University—Cape Breton island.
4. Professor W. T. MacClement, of Queen's University—Northern Nova Scotia and eastern Prince Edward Island.
5. Professor H. G. Perry, of Acadia University—Queens and Prince counties, Prince Edward Island.
6. Rev. Professor Vachon, Laval University—Eastern and northern New Brunswick.

The results of this work are most encouraging. The different lecturers never failed to adapt themselves unhesitatingly to the local conditions. Hence, the work was not carried out according to any fixed method. Cannery managers, foremen, cannery helpers, fishermen and others interested were called together in halls, schools, etc., when addresses were given and discussions invited. Also groups were addressed in the canneries, on the wharves, etc., as opportunity might offer and in different instances, access to the churches was sought, when the guiding thought of the proper use of the natural gifts of the Creator was impressed.

The direct information given the fishermen and others interested has resulted in a much more general knowledge of the natural history of the lobster, and the need for its protection. As a consequence, the liberation, by the fishermen, of all egg-bearing lobsters found in their traps, is obviously becoming more general. The fishermen are discussing the natural history of the lobster, and the desirability, in their own interests, of affording it proper protection, to an extent they were not doing before, and such discussions are sure to be helpful. It also seems evident that the need for co-operation by the fishermen and cannerymen with the department in protecting the industry is more generally realized.

This campaign was followed up during the winter, when the fishermen have more time at their disposal, by a series of addresses by Mr. Halkett. These addresses were illustrated with lantern slides, and as a general thing they aroused keen interest. Mr. Halkett's time was entirely taken up during the winter in western Nova Scotia, but it is the intention that he will resume such work on other portions of the coast during the winter of next year.

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CONTROL AND PROTECTION OF FISHERIES.

The important work of the year in this connection is dealt with below under the heading, "Reorganization of the Outside Service." It is therefore considered unnecessary to make any remarks at this point.

FISHERIES PATROL SERVICE.

The work of fishery officers on both the Atlantic and Pacific coasts in enforcing close seasons and other fisheries regulations, and in preventing illegal fishing, is supplemented by that of motor-boats and small steamers which patrol stretches of the coast where it might otherwise be difficult for the officers to put an effective stop to violations of the law.

Three boats, the *A*, the *B*, and the *F*, patrolled the waters of Nova Scotia from Lunenburg county westward while two boats, (the *C* and the *E*) were on patrol duty along the shores of Halifax and Guysborough counties and the Northumberland strait shore of the province. Some seizures of illegally set lobster gear were made, but on the whole the regulations were well observed.

Prince Edward Island waters were patrolled by the *D*, the *J. L. Nelson* and the *Richmond*, throughout the summer, and by the *Ostrea* and the *33* for a brief period in the fall. A determined attempt at fishing lobsters in close season was so successfully suppressed by the vigilance of the patrol-boat captains and crews that the *Ostrea* and the *33* found nothing to accomplish during their period of patrol.

In patrolling New Brunswick waters, four boats were employed in the Bay of Fundy, one in the Northumberland strait, and one at Miscou and Shippegan islands. Owing to the energetic efforts of the special patrol officer employed at Whitehead, Grand Manan, where it has been a common practice to dynamite pollock, no attempts were made to use dynamite last year. The *Phalarope*, the *G*, and the *Sea-Gull* did good work in destroying lobster traps; and it is noteworthy that violations of the lobster fishing regulations are becoming fewer each year. In the Northumberland strait, the *Hudson* was on salmon patrol duty for a time at Miramichi bay, and later did good work on lobster patrol and nipped in the bud the attempts at illegal fishing. At Shippegan and Miscou islands, formerly notorious for lobster poaching, the illegal fishing has been broken up, due largely to the good work of the *En Avant*.

The steamer *Loos* is used by the inspector of fisheries for the province of Quebec, in patrolling the waters of the gulf of St. Lawrence, and in visiting the widely separated points on the north shore, which would otherwise be almost inaccessible. At the Magdalen islands, a hired motor-boat, the *Waldren W*, was employed on lobster patrol duty.

The steamer *Bradbury* patrolled lake Winnipeg, and assisted in collecting whitefish and pickerel spawn for the fish hatcheries.

The following regular patrol-boats were on patrol duty on the Pacific coast during the year:

Southern District (comprising the Fraser river, Howe sound, and part of the gulf of Georgia):—*Merrysea*, *Swan*, *Foam*, *Elk*, and *Semiahmo*.

Northern District:—*S.S. Crosby*, *Hawk*, *Kayex*, *Merlin*, *Linnet*, *Bonila Gannet*, *Kingfisher*, *Babine No. 1* and *Babine No. 2*.

Vancouver Island District:—*Cohoe*, *Gull*, *Black Raven*, *Heron*, *Egret*, *Alcedo*, and *Fispa*.

Besides the regular patrol-boats mentioned, twelve chartered launches were employed for periods ranging from two to six months in the Northern District; and two chartered launches and one confiscated launch, in controlling the operations of Indians in the Southern District.

Several seizures were made, and the illegal operations carried on by Skeena river and Rivers inlet fishermen were greatly curtailed.

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PUBLICITY AND TRANSPORTATION DIVISION.

In 1907 the department realized that if a demand for fish was to be built up in this country and the fresh fish industry developed accordingly, transportation facilities for fish had to be greatly improved and comparatively cheap rates made available. What the department did in such directions has been fully explained in previous reports, and need not therefore be repeated here. Suffice it to say that investigation left little room for doubt that the industry had attained such proportions that it could henceforth take care of itself so far as transportation charges are concerned. Hence, in August last, after due notice to those interested had been given, all such assistance was withdrawn as it was considered that from then on more effective work towards expanding the demand for fish generally could be done in other directions. This does not mean that the department will, in future, cease to give attention to more and more adequate transportation facilities being provided. On the contrary, close direct effort will be continued along such lines.

To enable the department to best serve the industry, a new division known as the "Publicity and Transportation Division" was added during the past year. An officer to take charge of this division was not secured until late on in the year, so that actual organization thereof did not begin until the 15th December last. Much has already been done through this division in the way of interesting the press of the country in giving attention to the great asset it has in its fisheries by affording space to articles containing interesting information about the fisheries and otherwise. Efforts are being made through this division to have the schools of the country give greater attention to our fisheries, and a contest has already been instituted among the pupils of domestic science schools—the future housewives—throughout the Dominion, in the use of fish. Prizes are being offered for the best original recipes. Also, an essay writing contest among the pupils of the schools generally is being organized with the object of arousing deeper interest in the industry.

When the organization of this division is completed and the situation sufficiently studied, it is felt that it will be able to do a great deal towards increasing the demand for fish not only in this country, but throughout the fish importing countries of the world. It already has taken over the work that was undertaken by the Canadian Trade Commission and it will co-operate closely with the Intelligence Branch of the Department of Trade and Commerce.

By co-operation with the publishers of the *Canadian Fisherman*—the organ of the Canadian Fisheries Association—and the Canadian Trade Commission, this department arranged for the issue of three special editions of the *Canadian Fisherman* to be placed in the hands of importers of fish in the different parts of the world. These editions were published in English, French and Spanish, in parallel columns, as one or the other of these languages can be read in practically every fish-importing country. Each of these editions was carefully prepared and reflects much credit on the editor of the paper. They were quite fully descriptive, both by printed matter and illustrations, of our Canadian fisheries, and contained lists of addresses of our fish producers with invitations to importers to get into direct communication with them.

WORK OF THE BIOLOGICAL STATIONS.

The past season, 1919, has been the most successful one on record, as there have been larger staffs of scientific workers carrying on investigations at both stations, and the work is now carried on all the year round and not merely during the summer months, as formerly.

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St. Andrews Biological Station.

The scientific staff in 1919 numbered in all twenty-one. There were:—

Professor Knight, Kingston, Ont.

“ Bailey, Fredericton, N.B.

“ Cox, Fredericton, N.B.

“ Connolly, Antigonish, N.S.

“ J. W. Mavor, Union College, Schenectady, N.Y.

“ Vachon, Laval University, Montreal.

Doctor Slater Jackson, McGill University, Montreal.

Miss Shanly, McGill University, Montreal.

Doctor Louis Gross, McGill University, Montreal.

Miss Mossop, Western University, London, Ont.

Miss Anderson, Fredericton, N.B.

Mr. Leim, Toronto University, Toronto.

Dr. W. G. Savage, Bristol England.

W. Savage, Bristol, England.

Dr. Huntsman and Professor Prince, and the permanent aids on the staff: Messrs. E. G. Rigby, A. E. Calder, M. Bartlett, and Miss Harris and Miss Rigby.

Doctor Klugh, Kingston, and Mr. D. A. MacKay, Science Master, Collegiate Institute, Ottawa, did important lobster and other work in New Brunswick and Prince Edward Island. Over forty fishery problems occupied the staff's attention, of which the most important were:—

(1) Investigation of lobster breeding grounds, St. Mary's bay, by regular dredging, beam trawling, shrimp trawling, seine and special traps at regular intervals weekly. The launch *Prince* was busy with these investigations from June to September, and collected also “plankton” and hydrographic material for study. Doctor Cox, Doctor Connolly and Doctor Huntsman took part. Doctor Mavor completed, at the same time, a study of water movements in the southern half of the Bay of Fundy.

(2) The shad fisheries, spawning grounds, resorts of young shad, food, movements, etc., occupied Mr. Leim from July 29 to September 3. The Shubenacadie and Annapolis rivers were specially studied, and Doctor Huntsman assisted Mr. Leim's work.

(3) A disease of the salmon near Campbellton, New Brunswick, was studied by Doctor Huntsman.

(4) The young lobster distribution in Richmond bay, Prince Edward Island, and other localities, occupied Mr. Klugh and Mr. A. D. MacKay, under Professor Knight.

(5) Deterioration of canned lobsters and other bacteriological fish questions were the subjects of research by Miss Shanley and Miss Macfarlane, both experts of high repute.

(6) The mussel as a new food, its culture, growth, etc., were questions laboriously investigated by Miss Mossop.

(7) Food of fishes, especially diatoms in the surface life of the sea, occupied Professor L. W. Bailey.

Valuable material for the study of specialists in various university laboratories was collected by the staff and was studied as follows:—

(a) Professor Willey, McGill.—Stomachs and food contents of plaice and other flat fishes.

(b) F. Johansen, Ottawa.—Life-history of sea perch or cunner, and its value as a new food fish.

(c) Professor Clara Benson, Toronto.—The flesh of skate, dogfish, etc., as food.

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(d) Miss Neff, Toronto.—The hake as a food fish and reasons for unsatisfactory refrigeration of the same.

(e) The late Prof. E. MacKay, Halifax.—Spoiling of canned lobsters and clams.

(f) Prof. Piersol, Toronto.—The flesh of the hake as a food (histological study).

(g) Dr. Clemens, Toronto.—The Mutton fish, a new food fish, and the ciscoes of lake Erie.

In addition to these lines of work, a committee was formed of representatives from MacDonald College, St. Anne; MacDonald Institute, Guelph; and the Domestic Science Department, Toronto, including Professor Clara Benson, Professor Annie Laird, both of Toronto, Miss Watson and Miss Hill; and reports have been already submitted by Dr. Benson and Misses McHenry and Martin on new varieties of fish upon the table and best modes of preparation and cooking.

The Biological launch *Prince*, under Captain Rigby, with Mr. A. E. Calder and Mr. D. V. Bourgeois, carried out the programme of observations in the Bay of Fundy during the winter months, and secured valuable information *re* the spawning and migrations of smelt, bass, tommy cod, etc., and taking temperatures and salinities.

Preparations for a course of biological and fish culture training for Dominion hatchery officers were made at St. Andrews, but the work was postponed until 1920. It was arranged also that Doctor Knight, Doctor Huntsman and Professor Prince should give addresses to the reorganized staff of fishery officers in the Maritime Provinces. Professor Prince gave twelve addresses in this connection in February and March.

Pacific Station, British Columbia.

The Pacific Station was chiefly occupied with problems relating to the salmon, herring, various rock cods, etc., and with the solution of questions referred for report by the Fisheries Department. The station's launch *Orduna* made continual cruises to the various fishing localities, and much material for determining the occurrence, migrations and feeding and breeding habits of fish was collected. Professor J. J. R. MacLeod, of Toronto University, got ample material of fresh value for his researches, and Mr. C. Berkeley completed an important report on the bacteriology and chemistry of sea water in connection with fish life.

Doctor Fraser, in view of the shortage of university professors in British Columbia University, spent three months in Vancouver, giving university lectures in zoology at the request of the president, and with the sanction of the Biological Board.

The Museum and Library received valuable additions, and new apparatus and reagents for research were procured.

Publication of Reports.

The board have nearly ready for issue the following publications:—

(1) Leaflets.—Popular leaflets for the information of the fishermen and the public on new food fishes, new effective baits for fish, causes of decay of fish, etc., have been completed by members of the staff.

(2) Bulletins.—In addition to a handsome bulletin on the "Canadian Plaice," three new bulletins will soon be issued, viz.: The Lumpfish, by Professor Cox; The Angler Fish, by Professor Connolly, and the Mutton Fish, by Doctor Clemens.

(3) A new volume of "Contributions to Canadian Biology," 1919-20, includes fourteen reports, many of them of great and immediate practical use to the public; others of scientific value as aids to the conservation and expansion of the fisheries. The titles of the reports in the series are:—

1. Further studies on the Growth Rate in Pacific Salmon. *By C. McLean Fraser, Ph.D., F.R.C.S., etc., Curator of the Pacific Biological Station, Departure Bay, British Columbia.*
2. Some Apparent Effects of the Severe Weather of the Winter and Spring (1915-1916) on the Marine Organisms in the Vicinity of Departure Bay, British Columbia. *By C. McLean Fraser, Ph.D., F.R.S.C., etc., Curator of the Pacific Biological Station, Departure Bay, British Columbia.*
3. Temperature and Specific Gravity Variations in the Surface Waters of Departure Bay, British Columbia. *By C. McLean Fraser, Ph.D., F.R.S.C., etc., Curator of the Pacific Biological Station, Departure Bay, British Columbia.*
4. Experimental Cultures of Diatoms Occurring Near St. Andrews, N.B. *By Clara W. Fritz, B.A., M.Sc., Principal of East Angus Academy, Quebec.*
5. Plankton Diatoms: Their Distribution and Bathymetric Range in St. Andrews Waters. *By Clara W. Fritz, B.A., M.Sc., Principal of East Angus Academy, Quebec.*
6. A Contribution to the Biology of the Mutton Fish (Zoarcæ). *By W. A. Clemens, Ph.D., Assist. Prof. of Biology, University of Toronto, and Lucy Smith Clemens, Ph.D.*
7. Eastern Canadian Plankton: The Distribution of the Tomopteridae Obtained During Canadian Fisheries Expedition, 1914-1915. *By A. G. Huntsman, B.A., M.B., F.R.S.C., Biologist to the Biological Board of Canada.*
8. Eastern Canadian Plankton: Distribution of Floating Tunicates (*Thaliacea*) obtained during Canadian Fisheries Expedition, 1914-1915. *By A. G. Huntsman, B.A., M.B., F.R.S.C., Biologist to the Biological Board of Canada.*
9. An Investigation into the Rate of Putrefaction in the Commoner Food Fish Caught in and Around Passamaquoddy Bay. *By Louis Gross, M.D., Douglas Fellow in Pathology, McGill University, Montreal.*
10. Canned Sardines: The Causes of "Swells" or "Blown Cans." *By Wilfred Sadler, M.Sc., University of British Columbia, Vancouver, Canada.*
11. List of Fishes Collected in 1917 off the Cape Breton Coast and the Magdalen Islands. *By Philip Cox, Ph. D., B.A., etc., Professor in Geology, University of New Brunswick.*
12. The Diatoms of Canada. *By L. W. Bailey, L.L.D., F.R.S.C., and A. H. MacKay, L.L.D., F.R.S.C.*
13. The Utilization of Dogfish and Selachians. *By Prof. J. W. Mavor, Ph.D., Union College, Schenectady, N.Y.*
14. Hydroids of Eastern Canada. *By C. McLean Fraser, Ph.D., F.R.S.C.*

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NATURAL HISTORY INVESTIGATIONS.

The Fisheries Naturalist of the Department, Mr. Andrew Halkett, besides taking part during the year in the educational campaign for lobster conservation, referred to above, carried out the following investigations:—

Lobster observations on the coast of the Bay of Fundy, N.B., and at the Magdalen Islands.

Investigations into the condition of scallops at Mahone Bay, N.S.

Observations on the metamorphosis of the scallop.

Identification of a collection of specimens from Hudson Bay waters, received from Rev. W. G. Walton, missionary at Fort George, Que.

Details in regard to these investigations and their results are to be found in Appendix 2 to this report.

FISH CULTURE.

The fish cultural operations for the calendar year 1919 embraced the fresh-water and anadromous species only, and were confined almost entirely to the most important commercial food fishes, such as Atlantic salmon, in the east, whitefish, cisco, salmon trout and pickerel in the interior, and the Pacific salmon in the west.

The commercial species were practically all distributed as fry, after the food-sac was absorbed, on the natural spawning areas, and largely where such eggs were collected, but a small percentage was reared to the advanced fry and fingerling stages. The sporting species such as speckled trout in the east, and cutthroat and rainbow trout in the west, were hatched in small numbers, and after adequate return was made to the areas where the eggs were collected, were practically all distributed in public waters. A percentage was allotted to privately controlled or leased areas, on payment of nominal prices, and the distribution expenses.

The sockeye salmon hatchery on Stuart lake at the headwaters of the Fraser, which was closed in 1916, was reopened. It was filled to capacity with eggs collected in the Babine lake district on the Skeena, without any appreciable effect on the spawning areas of that district, as these were abundantly seeded, and there were more unspent salmon in the creeks where the eggs were collected at the close than at the beginning of the egg-collecting season.

The construction of a larger and more modern hatchery on Granite creek, Lakelse lake, was undertaken. This hatchery is to take the place of the old one that was put out of commission by floods in the fall of 1917.

The total distribution of all species was increased over that of 1918, by over 45,500,000.

The total collection of eggs in the east and in the interior, was not as large as usual, but the collection of the different Pacific salmon eggs largely exceeded that of recent years, and in addition, the spawning grounds of the British Columbia rivers, except the upper Fraser, were abundantly seeded.

There are 35 main hatcheries, 11 subsidiary hatcheries, and 6 salmon retaining ponds in operation. From these the total distribution of the different species in each province, during the season of 1919, was as follows:—

Distribution of eggs and fry by Provinces, during 1919.

Nova Scotia—		
Atlantic salmon.....	7,210,500	
Rainbow trout.....	83,000	
Speckled trout.....	330,000	
		7,623,500
New Brunswick—		
Atlantic salmon.....	9,482,305	
Speckled trout.....	348,600	
		9,830,905

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Prince Edward Island—			
Atlantic salmon.....	859,379		
Speckled trout.....	125,635		
			985,014
Quebec—			
Atlantic salmon.....	6,487,251		
Speckled trout.....	253,935		
			6,741,186
Ontario—			
Spring salmon.....	374,500		
Whitefish.....	276,710,000		
Salmon trout.....	31,746,850		
Herring.....	46,340,000		
Pickarel.....	177,150,000		
			532,321,350
Manitoba—			
Whitefish.....	297,975,000		297,975,000
Saskatchewan—			
Whitefish.....	59,039,000		
			59,039,000
Alberta—			
Atlantic salmon.....	154,574		
Rainbow trout.....	166,575		
Cutthroat trout.....	118,936		
Salmon trout.....	190,701		
			630,786
British Columbia—			
Atlantic salmon.....	320,000		
Rainbow trout.....	9,175		
Cutthroat trout.....	126,530		
Steelhead salmon.....	63,798		
Kamloops trout.....	1,198,300		
Sockeye salmon.....	54,443,875		
Spring salmon.....	2,722,960		
Cohoe salmon.....	3,952,819		
Pink salmon.....	40,000		
Chum salmon.....	383,000		
Speckled trout.....	17,052		
Whitefish.....	6,600,000		
			69,877,509
Total distribution.....			
			985,024,250

A detailed report on the fish cultural operations of the department is being published separately in pamphlet form.

The good effects of the fish culture service have become more and more manifest on all sides, with the possible exception, to some extent, of the sockeye salmon culture in British Columbia. But even in that fishery there is tangible evidence of its beneficial effects. Since the unfortunate depletion of the Fraser river, due to international conditions and railway building operations, the Skeena river is the most important salmon-producing stream in British Columbia. Two hatcheries, which have been propagating sockeye, have been in operation on this stream for some years. One of these hatcheries, which is located on a stream flowing into Babine lake, was placed where it is owing to the facilities the stream afforded for the operation of a hatchery, but the stream itself was not frequented to any important extent by salmon. After stocking this stream from the hatchery for some years, salmon now each year crowd into it in such large numbers to spawn that it is practically relied upon for filling the hatchery. Moreover, while for a long series of years the sockeye pack of the Skeena river had been going down, the decline ended in 1917, and during the past two years it has been rapidly recovering. Last season the sockeye pack there was 184,945 cases, or only about 2,000 cases less than the biggest pack ever put up on that river.

In the inland fisheries the good results are patent to all. Lake Winnipeg, the fisheries of which were in a seriously low condition some years ago, have been brought back, until now they are as productive as they ever were, the catch per net being as heavy as it ever was.

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In the Great Lakes until recently fish hatching has been largely centered in lake Erie and in lake Ontario. Twenty-five years ago lake Erie, which is the greatest whitefish producer of the Great Lakes, was regarded as practically depleted of whitefish. The Canadian catch that year was but 1,480 cwts., but by co-operative fish-breeding efforts in both Canada and the United States, not only have the catches been rapidly increasing, until now they are, one year with another, bigger than they ever were, but since 1903 there has been no close season on this lake. In 1915 the Canadian catch had risen to 18,322 cwts. of whitefish. There have been fluctuations since, due to weather conditions, and not to the scarcity of fish.

Lake Ontario twenty years ago was also regarded as depleted of whitefish, the Canadian catch that year being 1,291 cwts. Now it is second only to lake Erie, the catch of such fish there last year being 13,365 cwts.

Atlantic salmon are increasing in the streams that are being stocked. The more important rivers are being maintained at a high state of productiveness and salmon are coming back to various streams, as a result of stocking, from which they were practically absent for many years. Recently one of our enthusiastic sport fishermen wrote to the department that he spent the 12th and 13th of September on the Petitcodiac river, which was then at high water, and it seemed almost full of salmon. He stated that if the stream is properly protected it will, in a few years, contain as many fish as it did in the early days of settlement, provided of course that the placing of fry in it each year is continued for some years to come.

OYSTER CULTURE.

The officer in charge of this service visited the various oyster beds in the gulf of St. Lawrence, cleaned such as required cleaning, and restocked others with young oysters.

From several oyster areas at Richibucto, N.B., 230 barrels of small oysters were taken, and planted in Brule harbour, N.S. Later in the season they were reported to be growing nicely.

The oysters planted in the Narrows below Richibucto during the preceding year were found to have lived and grown well.

While some young and healthy oysters were found in parts of Richmond bay, P.E.I., where the blight of a few years ago had practically killed off the stock, the conditions throughout the bay generally have not improved much, if any, and the officer in charge is unable to suggest any method by which improvement may be accelerated.

The beds at Shediac and Cocagne were examined and found to be in a very weedy condition. They were cleaned and raked. The Shediac beds especially would seem to require restocking, however.

INSPECTION OF FISH.

The inspection of pickled fish and barrels was carried on during the season of 1919 by one inspector in Nova Scotia, two in New Brunswick, and by one, during the winter herring season, in British Columbia.

The sudden ending of the war in 1918 so upset markets for pickled fish that much of the herring pack of that year was carried over into the season of 1919. Part of it was sold for much lower prices than were anticipated when the curing was taking place, while part of it remained unsold throughout the whole of the latter year. As a consequence of these unsatisfactory conditions, and the

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high cost of barrels and salt, much less attention than usual was given to catching and curing herring during the 1919 season, and so the number of barrels of pickled fish submitted for inspection was smaller than in the preceeding year.

The following shows the number of packers who submitted their fish for inspection and the number of barrels inspected annually since inspection was first made available.

Year.	Packers.	Barrels Inspected.
1915.....	16	1,320
1916.....	73	7,213
1917.....	80	8,977
1918.....	110	20,664
1919.....	82	8,730

Instruction was given in barrelmaking, and fish curing, by the inspectors during the season. The inspectors, on occasion, have had to make stencils, repair damaged barrels and even dictate the correspondence of some of those seeking advice.

It should be noted that the Inspection Branch extends its instruction beyond barrel making, and the packing of fish. For example, by the advice and under the supervision of this branch, two firms on the Gaspé coast erected smokehouses and started the smoking of fish last spring.

The Act under which inspection is carried on, which was passed in 1914, was designed to encourage improved methods of putting up pickled fish and the use of proper barrels. It does not, however, compel the use of improved methods. It simply provides that packers using proper packages and putting up their fish accordingly may have their packages and fish inspected, and if found to be in accordance with requirements, the former will be branded with a Government brand as a guarantee of the quality of the contents. While, as a result of this Act, and the direct instructions given by the general inspector and district inspectors of pickled fish, and the continuous efforts that were made to induce packers to adopt better methods, some progress has been made, it has been slow. Indeed, those interested are almost unanimously of opinion that before the standard of our pickled fish can be raised to the level on which it should be, it is necessary to compel packers to use proper packages and put up their fish according to proper methods. To this end a Bill to amend the Fish Inspection Act was introduced into the House of Commons and had its first reading on the 28th of March, 1919. It was then referred to the Select Standing Committee on Marine and Fisheries, for consideration, but unfortunately the time of that committee was so continuously occupied that it was unable to deal with the Bill. It is, consequently, proposed to take up the matter again during the next session of Parliament, when it is hoped that an amending Act will be passed.

It is considered well, however, to lay stress here on the fact that those engaging in the industry should not rely too far on legislation to encourage better methods. It is realized by the leaders in the industry that Canada cannot take the place that she should in the fish markets of the world unless her producers provide articles of standard quality. It is to be hoped that these leading producers will not only insist on first-class quality in all that they themselves produce, and will study the classes of curing designed to meet the tastes of the different importing countries and prepare their fish for such countries accordingly, but that they will do their utmost to influence the smaller producers on all parts of the coast to do likewise.

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CANNERY INSPECTION.

During the canning season of 1919, the outside staff of fishery officers systematically inspected all fish and shellfish canneries.

This inspection is carried on under authority of the Meat and Canned Foods Act, and attention is given chiefly to seeing that buildings and utensils are in accordance with the standards laid down in the regulations; that fish undergoing the process of canning are sound, and fit for human food; and that the cans contain the weight of fish prescribed by, and are marked in accordance with the law.

There were in operation on the Atlantic coast, 544 establishments canning lobsters; two canning sardines; one canning salmon; four canning clams; and fifteen canning other fish such as mackerel, cod, and haddock.

On the Pacific coast salmon were canned in seventy-seven establishments; herring, pilchards, etc., in seven; and clams in one. In the Prairie Provinces lake fish were canned in one establishment.

In all, 1,882 inspections were made and reported on during the year, and while no very serious defects were found, a number of minor faults in buildings and equipment were noted and corrected.

DRIFT-NET FISHING OPERATIONS.

As in the preceding year, the steamer *Thirty-Three* was equipped with herring and mackerel nets and sent to sea in the summer of 1919.

Operations began in the end of May, and continued till the middle of September, with intervals due to unfavourable weather, and the need for repairs to gear.

From May 27 to June 10 mackerel fishing was carried on in the waters ranging from Cape Sable to Cape Canso, and resulted in a catch of 17,530 pounds of mackerel.

From June 13 to June 25 mackerel fishing was continued in the waters between Inverness county and Prince Edward Island, when a catch of 25,795 pounds of mackerel was landed.

From July 6 to July 9, herring fishing was carried on off Halifax and resulted in a catch of twelve barrels.

From July 16 to July 20, herring fishing was continued off Port Hood, Inverness county, but only one barrel of herring and 319 pounds of mackerel were taken.

From July 28 to August 2, operations were carried on off North Sydney, but no fish were taken.

From August 8 to September 15 herring fishing was continued in Chaleur Bay, when 184 barrels of herring and 1,500 pounds of mackerel were taken.

The fish were sold in the port nearest to the fishing ground being operated on, where buyers were found prepared to handle the catches.

BAIT-REPORTING SERVICE.

The bait-reporting service was instituted for the purpose of directing masters of fishing vessels and those in search of bait to where supplies might be available throughout the spring, summer and fall. Definite information is gathered by officers of the department as to the quantities of bait landed along certain stretches of the coast day by day. These officers send the information by telegram daily to certain ports, where it is posted up. The information is also published free by the Halifax daily newspapers.

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In the spring months telegrams giving information as to ice conditions and bait supplies were sent from the Magdalen Islands, Souris, P.E.I., Queensport and North Sydney, N.S., to Canso, Halifax, and Lunenburg, N.S.

During July and August telegrams were sent from Canso, Wine harbour, and Musquodoboit harbour, covering the coasts of Guysboro and Halifax counties, to North Sydney, Canso, Halifax, Lunenburg, and Shelburne, N.S. Also, from Lockeport to Halifax, Shelburne, and Barrington Passage, the latter for transmission by telephone to Clark's Harbour and Port Latour; and from Shag Harbour, Yarmouth, and Digby to Halifax, Shelburne, Lockeport, and Barrington Passage, N.S.

From September to the middle of November telegrams were sent from Campobello, N.B., covering information as to supplies of bait in the counties of Charlotte and St. John, N.B., to Digby, Yarmouth, Pubnico, and Barrington Passage, N.S.

FISHERIES STATISTICS.

Under an arrangement between this department and the Dominion Bureau of Statistics, the latter now compiles and publishes the annual statistics relating to the fisheries, as part III of its census of Industry. The information is secured partly from manufacturing establishments, on individual schedules designed to fit in with the Bureau's general scheme of securing industrial statistics, and partly by the officers of this Department, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department, and afterwards handed over to the Bureau of Statistics for publication. A general review only, made up from information obtained by the department from time to time, is given in this report.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea-fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department and made public through the press, monthly.

FISHING BOUNTIES.

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1919 payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$6.40 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$4.10 each.

There were 13,068 bounty claims received, and 13,061 paid. In the preceding year 14,452 claims were received, and 14,440 paid.

The total amount paid was \$155,136.70, allocated as follows:—

To 749 vessels and their crews, \$52,990.05.

To 12,319 boats and their crews, \$102,146.65.

The following table shows in detail the payment of the bounty by counties for the year 1919:—

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Provinces and Counties.	No. of vessels.	Tonnage.	Average Tonnage	No. of Men.	Amount paid.	No. of Boats.	No. of Men.	Amount paid.	\$ cts.	Total Bounty paid to vessels and boats, 1919.
NOVA SCOTIA—										
Annapolis.....	1	13	13	3	32 20	154	256	1,202 30	1,234 50	
Antigonish.....	26	402	15	116	1,142 15	467	193	1,930 30	930 30	
Cape Breton.....	6	164	27	50	483 10	354	5	23 50	5,177 85	
Dugby.....	58	923	16	295	2,808 15	792	601	2,818 10	3,301 20	
GuySBoro.....	26	1,032	16	306	2,987 10	1,283	1,283	6,047 90	8,856 05	
Halifax.....	68	436	16	127	1,248 80	1,292	1,734	8,400 50	11,387 60	
Inverness.....	1	11	11	3	30 20	53	778	3,575 90	4,824 70	
Kings.....	145	8,815	61	2,316	23,626 65	536	76	3,364 60	394 80	
Lunenburg.....	1	15	15	2	27 80	46	639	3,155 90	26,782 55	
Pictou.....	1	15	15	2	27 80	46	61	296 10	323 90	
Queens.....	12	146	12	31	344 40	152	258	1,209 80	1,554 20	
Richmond.....	41	737	18	208	2,065 50	470	810	3,791 00	5,856 50	
Sherburne.....	32	669	21	220	2,073 55	551	1,078	4,970 80	7,044 35	
Victoria.....	12	162	14	52	494 05	337	516	2,452 60	2,946 65	
Yarmouth.....	29	1,209	42	388	3,689 20	119	262	1,193 20	4,882 40	
Totals.....	458	14,734	32	4,117	41,052 85	5,849	9,421	44,468 20	85,521 05	
NEW BRUNSWICK—										
Charlotte.....	9	117	13	25	273 00	382	636	2,985 75	3,258 75	
Gloucester.....	243	3,517	14	1,056	10,268 75	162	381	1,724 10	11,992 85	
Kent.....	7	72	10	17	180 80	44	72	339 20	520 00	
Northumberland.....	2	34	17	8	85 20	2	4	18 40	103 60	
Restigouche.....	1	14	14	3	33 20	5	11	50 10	50 10	
St. John.....	1	14	14	3	33 20	16	27	126 70	159 90	
Totals.....	262	3,754	14	1,109	10,840 95	611	1,131	5,244 25	16,085 20	
PRINCE EDWARD ISLAND—										
Kings.....	8	138	17	26	304 40	395	556	2,674 00	2,978 40	
Prince.....	7	99	14	28	278 20	406	938	4,242 70	4,520 90	
Queens.....	2	24	12	4	49 60	116	253	1,153 30	1,202 90	
Totals.....	17	261	15	58	632 20	917	1,747	8,070 00	8,702 20	
QUEBEC—										
Bonaventure.....	2	26	13	8	77 20	876	1,569	7,306 20	7,383 40	
Gaspé.....	7	76	11	25	245 85	2,977	6,098	27,968 40	28,212 25	
Rimouski.....	3	45	15	15	141 00	83	121	578 80	578 80	
Saguenay.....	12	147	12	58	464 05	1,006	1,851	8,512 80	8,653 80	
Totals.....	749	18,896	25	5,342	52,990 05	12,319	21,918	102,146 65	155,136 70	

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PROPOSED NEW ACTIVITIES.

PROPOSED SCIENTIFIC DIVISION.

At the present time the Canadian Biological Board is the only institution carrying on fisheries scientific investigations. While this board, particularly in more recent years, has been doing good work, it is a volunteer organization, and consequently cannot be expected to cope with the vast amount of fisheries research work that should be undertaken without delay. It is of primary importance that thorough investigation should be made to ascertain the migrations of fish, the causes of such migrations, the effects of different methods of capturing fish, the spawning places of fish, the haunts of young fish, the abundance of the organisms which supply food for fish, and to secure information on a great number of other questions. Also, close study should be made into methods of preservation of fish. While the preservation of fish by salting has been in practice for hundreds of years, little improvement in the methods has been devised, strange to say. Each year, large quantities of fish are either spoiled in curing or are of a low grade, owing to lack of knowledge on the part of those carrying out the operations as to certain causes and their effects.

Keeping in view the fact that at least 25 per cent of the weight of fish caught is unedible, but that this unedible fish can be converted by proper methods into oil of high grade, and into valuable food for stock, which in turn becomes food for man—as well as into unusually good fertilizer, to increase the crops on which stock feeds, it is a matter of great regret that up to the present no feasible means of handling fish offal so as to convert it into such products, has been found on the large portions of the coast, where the quantities produced are now comparatively small. It is obviously of great importance that close investigation be made with the object of finding some means, either by cheap concentration of the raw material at the places it is produced, and sending the concentrated article to a central plant to be finished, or otherwise.

As the waters of our Atlantic coast resorted to by our fishermen are also frequented by those of Newfoundland and the United States, and those on the Pacific coast by our own fishermen and those of the United States, such research work is of as much interest to these countries as it is to Canada. Obviously, it could be carried out most economically most efficiently and most expeditiously, through joint action by the three countries. Hence, steps have been started looking to the formation of a scientific council consisting of representatives of these three countries for the carrying out of such work. It is hoped that such can be effected during the year 1920-21.

To take direct charge of such work, it has been decided to add to the Fisheries Branch a Scientific Division. It is hoped that when this division gets into active operation, the trade will closely co-operate with it, and will not fail to make it a practice to refer to the department for thorough investigation any problems that may arise in their experience. Also, that they will always be ready to assist in proper investigations, by observing and tabulating such data as may be desired.

PROPOSED TECHNICAL EDUCATION.

Prior to the war, the Fisheries Branch had desired to take up the question of technical education amongst the fishermen, embracing not only the better handling of fish, but also navigation, the operation, adjustment and effecting of minor repairs to gasoline engines, improved methods of fishing, etc. It was then found necessary to await consideration of the whole question of such education, in the light of the report of the commission that had been appointed to fully investigate the matter; but this was delayed by the war. It is, however, hoped that following the legislation of last year for the assistance of technical education, it will be found possible for at least the different provinces specially interested, with the federal aid available, to take up such work.

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Direct educational work amongst the fishermen and producers has, however, been given such attention as has been possible, and during the coming year it is contemplated that it can be expanded to an important degree, by direct instructions in the packing and curing of fish, and in the handling of fresh fish.

RE-ORGANIZATION OF THE OUTSIDE SERVICE.

The previous service—with the exception of that in British Columbia, where reorganization was effected before the war—was merely a growth of the organization originally made following Confederation. It contemplated the employment of a large number of local officers who were not paid anything like a sufficient salary to enable them to devote their whole time and attention to their duties, and consequently, as a general thing, they were first of all farmers, blacksmiths, etc., and afterwards fishery officers. Besides while the salary was small, these officers, when using their own teams, were allowed to charge ten cents a mile for travelling. This resulted in much unnecessary travelling, which made the service on the whole an expensive one, though it was far from adequate. There were in the previous service some officers who were striking exceptions to the general rule and who were efficient to a high degree. It was a painful matter to the department to find it necessary that the employment of such men should be discontinued to enable a reorganization of the whole service to be effected.

Under the reorganized service, Canada—with the exception of Ontario and the inland waters of Quebec, where the fisheries are being administered by the provinces—is divided into three main fisheries divisions, the fisheries within each being similar in character. These divisions are:—

Eastern Division—consisting of the Atlantic provinces.

Prairie Division—consisting of the three Prairie Provinces and the territories north thereof.

Western Division—consisting of British Columbia.

Each division is placed under the direct supervision of a chief inspector. This officer is given extensive powers so that he can co-ordinate the whole service in his division to the best advantage by moving patrol-boats from one district to another as needs require, as well as by using the services of the overseers for certain districts in others at special times, etc.

Each province is, as heretofore, divided into district inspectorates, and these districts are again subdivided into overseers' districts, each of which latter, however, is made as large as it is practicable for one man to supervise by giving his whole time and attention to his duties. The overseers appointed for these districts were selected by the Civil Service Commission and were required to have qualifications that would assure efficient performance of their duties. They must devote their whole time and energies to their duties, and are also called upon to provide themselves, at their own expense, with horses and vehicles, and where needed, with motor-boats or canoes, for the maintenance of which a reasonable allowance, in addition to their salaries, is made; but no charges may be made for travelling in addition to the actual hotel expenses of the officers themselves. In the Eastern Division ninety-two overseer positions have been replaced by fifty-six.

The duties of the new officers will not be confined to preventing violations of the law. Following their appointment they were called together in groups and given a preliminary course of instruction on fish life, as well as on their administrative duties, and it is the intention to arrange for a course of instruction to them each year at a suitable time, covering fish life, curing and packing of fish, etc., so that they will not only be able to intelligently bring to the attention of the department the things that should be done to facilitate the industry, but will be helpful to those engaging in the industry in a direct way.

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It has, at times, been urged that Canada is spending too much in the protection of her fisheries, but an examination of the conditions will make it obvious that keeping in view the vast amount of work involved the service is being carried on in an unusually economical manner. It must not be overlooked that unlike most other countries having fisheries of importance, the Canadian federal authorities are responsible for the regulation and administration of the fisheries not only on our extensive sea coasts, but in all parts of our great Dominion, with the exception of Ontario and the inland portions of Quebec.

It must also not be overlooked that the Canadian inshore and inland fisheries, consisting of salmon, lobsters, smelts, whitefish, salmon trout, pickerel, etc., etc., make up at least half the total value of the fisheries of our country; and, from the nature of these fisheries, if they were not carefully protected, they would be depleted in a few years.

On account of the greater abundance of the fisheries and the greater density of the population, relatively more officers are employed in the Maritime Provinces than in any other part of the Dominion. An examination of the average size of the districts there will, therefore, give at least a fair indication of the protective service employed, and will show that it is no greater than experience has made it clear is absolutely necessary if an efficient service is to be maintained. Obviously it would be better to have no service than one that would not reasonably carry out the duties involved, as a waste of money would result.

Nova Scotia covers 21,528 square miles, and owing to its shape it has an unusually extensive coast line, all of which is adjacent to waters containing valuable fisheries. It also has a large number of splendid fishing streams and lakes. We have in Nova Scotia three district inspectors of fisheries and thirty-two fishery overseers, or an average of $672\frac{3}{4}$ square miles of land to each overseer.

New Brunswick covers 27,911 square miles and possesses several large rivers, and a great number of smaller ones, as well as lakes. There we have three district inspectors and twenty-one overseers, or an average of 1,329 square miles for each overseer.

Prince Edward Island has an area of 2,184 square miles. It also is plentifully supplied with streams. There we have one inspector and four overseers, or an average of 546 square miles to each overseer.

As above indicated, in the western provinces the area under the supervision of each overseer is vastly larger.

These overseers are also charged to see that the coastal fisheries are carried on properly and that no illegally caught fish are landed. To assist them in doing this a Fisheries Patrol service has been found absolutely essential; but this patrol service also is as small as is compatible with efficiency. The Atlantic coast line is approximately 5,000 miles long, without taking into account the smaller indentations. We maintain there fifteen small patrol-boats and one fairly large steamer. Thus on the average, each boat has $312\frac{1}{2}$ miles of coast to patrol. The steamer is needed to control conditions in the northern part of the gulf of St. Lawrence. On the Pacific coast there are about 7,000 miles of sea coast. There we maintained this year twenty boats, or an average of 350 miles to each boat. It is true that during the height of the salmon-fishing season eighteen additional boats were hired, mainly for short periods, but even with these, there was at that time an average of 184 miles for each boat.

While the reorganized service when it gets into proper working order will be a vast improvement in every way on the previous service, it will cost little if any more. It will relieve headquarters of a vast amount of detail that in the past has been so exacting as to leave too little time for consideration of constructive work, and, as previously indicated, it will therefore enable the branch to give greater attention to the devising and carrying out of measures for the general encouragement of the development of the fisheries.

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REVIEW OF THE FISHERIES OF 1919.

The compilation of the statistics connected with the fisheries for 1919 has not been completed at the time of writing, consequently only an estimate of their total value and a general summary of the results of the year's operations can be given in this review.

The estimated marketed value of fish and fish products for the whole of Canada in the past year will be about \$58,000,000. This is less than that in the preceding year by about \$2,000,000. The falling-off in value is largely due to the very greatly reduced price paid for sardine herring in the Bay of Fundy, and to the diminished pack of chum salmon in British Columbia.

On the Atlantic coast weather conditions were quite favourable for fishing operations during the whole of the first half of the year, except in the last week of May, when a severe northeast storm destroyed a great many lobster traps and herring nets. In the second half of the year, short spells of bad weather occurred during July, September, and October. A heavy easterly gale in the first week of November wrecked or damaged many boats and much fishing gear, while a long stormy period in December seriously interfered with boat fishing.

On the Pacific coast the weather was rather unfavourable for fishing during the first half of the year, with the exception of the month of April. Good weather prevailed during the first three months of the second half of the year, but the final three months were characterized by rather unfavourable fishing weather.

ATLANTIC FISHERIES.

Cod, Haddock, Hake and Pollock.

Along the south shore of Nova Scotia cod, haddock and pollock fishing was exceptionally good. In the Cape Breton Island district, owing to lower prices and more remunerative employment on shore, the cod fishery was not prosecuted so vigorously as usual. The catch of haddock at Ingonish was less than in the preceding year, but around Cape North, owing to the operation of more trap-nets, it was greater. The landings of two steam trawlers at Port Hawkesbury, however, made up for any slackness in line fishing in the district.

In the Bay of Fundy district of New Brunswick, the catch of cod and hake was good. Pollock were exceptionally plentiful at Grand Manan, but rather scarce at Campobello and Deer Island.

In the northern district of New Brunswick, which borders the gulf of St. Lawrence, cod, haddock, and hake were not landed in such large quantities as in the preceding year. Unfavourable weather towards the end of the season and the high wages offered for labour in the woods induced many of the fishermen to give up fishing earlier than usual.

In Prince Edward Island the result of the cod, haddock, and hake fishery was not quite so good as in the preceding year. On the coasts of Gaspé cod was scarce until the end of the season, consequently the catch was not so large as that of 1918. Cod appeared in very large quantities along the shore of Saguenay county from Natashquan westward, early in June, and good catches were landed. From St. Augustin eastward to Blanc Sablon ice remained on the coast till a very late date. After it left, cod appeared in large quantities for about three weeks and good hauls were secured.

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Mackerel, Herring and Sardines.

The mackerel fishery gave better results than in the preceding year. Very good catches were made in Digby basin and on the shore of Annapolis county in Nova Scotia. This had not been the case for a number of years. Mackerel were plentiful in the Cape Breton Island district; prices were good and those engaged in this fishery had a successful season. There was a slight increase in the catch in New Brunswick. The spring mackerel fishery at Magdalen Islands resulted in a somewhat smaller catch, owing to a storm at the beginning of the season, which did much damage to nets.

The herring fishery in Nova Scotia was not prosecuted with the usual vigour, owing to low prices and a poor demand, consequently the catch was less than that of the year before. Taken over all, the quantity of herring landed in New Brunswick was about equal to the previous year's catch. At the Magdalen Islands these fish appeared in normal quantities in the spring. The catch was not quite so large as that of the preceding year, but it was sufficient to supply all the needs of the lobster and cod fishermen for bait, and of the smoke-houses.

The sardine fishery of the Bay of Fundy during the season under review was a very unprofitable one for fishermen. Sardine herring were never more plentiful in the weirs, but the price at which the fish were bought made the season financially one of the worst ever experienced. The ending of hostilities in November, 1918, almost entirely stopped the demand for canned sardines, and when the season of 1919 arrived a large proportion of the abnormal pack of the preceding season was still unsold. Most of the canneries, therefore, remained closed until the season was half over and prices were paid at which fishermen could not afford to operate.

Other Sea Fish.

The landings of halibut and swordfish were greater than in the preceding year, but those of albacore flatfish and tomcod were rather less.

Shellfish.

The lobster fishery on all parts of the coast resulted in a catch that was very considerably greater than that of the preceding year. It must be remembered, however, that the preceding year's catch, mainly owing to much rougher weather, was little more than half the average annual catch of the four years which preceded it. The catch was exceptionally good on the New Brunswick side of the Bay of Fundy. In the Cape Breton Island district it was said to be a record one. Along the gulf shores of New Brunswick, and around Prince Edward Island, there was a greatly increased catch, notwithstanding destruction of traps by a gale at the opening of the season. The results on the Gaspé coast were equal to those of the preceding year, but at the Magdalen Islands there was a falling off in the catch as a number of fishermen considered the price insufficient and turned their attention to cod and mackerel fishing before the end of the season.

The quantity of oysters taken was slightly less than that in the preceding year. Clams of various kinds were taken in about the same quantity.

River Spawning Fish.

The total salmon catch on the Atlantic coast was 50 per cent less than that of the year 1918, which in turn was less than that of 1917. The falling off was equally pronounced on all parts of the coast.

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While the smelt fishery was not quite so good in the northern part of New Brunswick, the principal seat of the fishery, owing to unfavourable weather at the opening of the season, it was better than that of the preceding year on all other parts of the coast.

The total catch of alewives was rather less, but its value was greater, owing to higher prices. Shad were not so plentiful as in the preceding year.

INLAND FISHERIES.

In the inland district of New Brunswick, which consists of the St. John River system, the catch of salmon for the season under review was said to be 25 per cent less than that for the preceding season.

The Ontario fisheries were not quite so good financially as in 1918. There was an increase in the catch of whitefish and of pike and a considerable increase in that of pickerel, but the quantity of trout taken was somewhat less, and of herring very much less.

There was an increase in the quantity of all kinds taken from lake Winnipegosis, Manitoba, during the winter season of 1918-19, but during the summer of 1919 the catch was less than half that of the preceding summer; pickerel, especially, being much less abundant.

In the northern district the total catch of all kinds during the winter of 1918-19, owing to a late start and fewer licenses having been issued, was less.

The summer fishery was practically a failure as a result of low water in the Saskatchewan river and tributaries, which prevented the collecting tug from reaching the fishing lakes.

The total catch of fish of various kinds throughout the province of Saskatchewan was not quite so good as that of the preceding year. While some lakes produced more others produced less, the increase or decrease in each case being due to a greater or smaller number of fishermen having operated. It is reported that none of the lakes show any sign of depletion.

In northern Alberta, there was a general increase in the production of fish. This was due to increased operations in lakes in which little fishing had previously taken place, to improved transportation facilities and to an increased local demand.

In the Yukon the run of salmon was not so good as in the preceding year, and the catch was small. In the Porcupine district, salmon fishing was a failure. The small run of salmon in the upper river is said to be due to the operations of a cannery at the river's mouth.

PACIFIC FISHERIES.

Salmon.

The total pack of all kinds of salmon throughout the province of British Columbia was 1,393,156 cases, against 1,616,157 cases in the preceding year. The decreased pack was mainly due to a falling-off in the demand for canned chum salmon, and to an increase in the exportation of the fish in a fresh state to the United States.

In the Fraser river district, the pack of sockeye salmon was greater by about 12,000 cases. The total pack of all varieties, however, was considerably less owing to the causes mentioned in the foregoing paragraph.

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In the northern district as a whole there was a shortage in the salmon pack of approximately 100,000 cases. The diminished pack is chiefly attributable to the Naas river, Rivers inlet and Bella Coola sections. While the sockeye run was as good as ever in the Naas river that of all other kinds was a complete failure owing, it is said, to the use of traps outside the Pearse canal.

Sockeye in the Skeena river were more abundant than they had been since 1913. Spring salmon were not so plentiful, however, and the run of pinks and cohoes was a poor one.

In the Bella Bella section all varieties of salmon were fairly plentiful, and the pack was above that of the preceding season. In Smiths inlet there was good run of all kinds. At the Massett inlet, Skidegate inlet and on the west coast of Queen Charlotte islands, salmon fishing was poor; but, from Cumshewa inlet southwards, chum salmon were plentiful.

In the Vancouver island district, the total catch of salmon was greater than that of 1918. The total pack was less, however, owing to the great exportation of fresh chum salmon to the United States.

Trolling for spring and coho salmon was carried on by a greater number of fishermen and while the individual catches were not so large, owing to unsuitable weather, the aggregate take by this method was fully equal to that of the preceding year.

Halibut.

The halibut fishery was successfully prosecuted from Prince Rupert and the total quantity landed was greater than in the year before. It has to be noted, however, that the landings of American vessels account for almost two thirds of the total.

Herring.

Herring were very abundant in the vicinity of Nanaimo harbour, and in the Barclay sound district, during the winter season of 1918-19 and large quantities were taken. After the signing of the armistice, in November, 1918, the demand for pickled herring in the United States, the chief market for such, fell off. Consequently, the quantity prepared in that way was much less. There was again a large pack of canned herring, while the quantity drysalted for the orient very greatly increased.

Other Sea Fish.

Pilchards of excellent quality were abundant on the west coast of Vancouver island and a large quantity was taken, most of which was canned. The business of canning these fish is increasing year by year. The catch of black cod was about the same as that in the preceding year. The landings of flatfish increased by about 30 per cent while those of red cod increased by about 14 per cent.

Whales.

The Kyuquot Naden Harbour and Rose Harbour whaling stations were operated during 1919 and the number of whales landed was 432. No whale meat was canned.

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GENERAL.

Unquestionably, good progress in the industry is being made. More care is being given year by year to the curing of our fish, and up-to-date methods of fishing are becoming more general.

Steam trawling has become firmly established on our Atlantic coast and, to a limited extent, on our Pacific coast. Drifting, particularly for mackerel, is beginning to take the place of anchored nets. Inshore fishermen are rapidly equipping their boats with motors so that they may, in a large measure be independent of wind and weather and so spend a great deal more time in actual fishing. In 1910 there were but 2,200 motor-boats used in the Atlantic fisheries. In 1919 the number had risen to about 12,000. For the whole of Canada the number is about 14,000.

I very much regret having to report that twenty-four men, seventeen on the Atlantic and seven on the Pacific—lost their lives in the prosecution of the fisheries, during the year.

In conclusion, I would express my high appreciation of the manner in which the officers and clerks of the Fisheries Branch performed their duties during the year.

I am, sir Your obedient servant,

G. J. DESBARATS,

Deputy Minister of the Naval Service.

APPENDIX 1.

REPORTS OF INSPECTORS OF FISHERIES.

REPORT OF CHIEF INSPECTOR, WARD FISHER, EASTERN FISHERIES DIVISION, FOR 1919.

Although I was appointed in August, 1919, under the reorganization of the outside fisheries service, as the chief inspector of the Eastern Fisheries Division, I did not actually take charge of the work until the latter part of November, and therefore had not been in a position to closely follow the operations carried on in the division during the whole of the year. I have had, fortunately, however, considerable supervisory experience as one of the inspectors for an important section of the division, and also for some years previous to the present appointment been engaged in an administrative capacity as an assistant to the general superintendent, and am therefore, not unfamiliar with the actual operations carried on, and the conditions affecting the fisheries of the division.

The division comprises the fisheries of the three eastern provinces, New Brunswick, Nova Scotia and Prince Edward Island, covering a seacoast of over 5,000 miles, and occupying a most strategic position from a fisheries point of view, as the waters are abundant with the chief commercial and food fishes. The number of persons employed in primary operations is about 38,000, and in canning and curing about 8,000, or a total of 46,000. The capital invested is over seven million dollars, and the marketed value of the catches annually for the past several years is about \$20,000,000. Therefore it can readily be seen that industrially and commercially as well as from an economic point of view, the industry is already of great value and offers as a natural resource one of the best opportunities for development.

The conditions under which the industry is carried on, and the product prepared and marketed, are rapidly changing, and consequently the reorganization of the administrative service was most timely, and should be potent for much good in connection with the regulation, conservation and expansion of the industry. Necessarily the working out of the reorganization in a satisfactory manner will occupy much time and attention, but with favourable conditions the prospects for a thoroughgoing betterment of the service are hopeful.

The general conditions affecting the fisheries during the past year have continued to be somewhat abnormal as a consequence of the conditions arising from the great war. Briefly, the following résumé of the principal fisheries, together with certain observations thereon, are presented.

(1)

LOBSTERS.

There was a very considerable increase in the catch throughout the whole division as compared with the preceding year. In Charlotte and St. John counties, New Brunswick, where a size limit of 9 inches has prevailed, the catch was the greatest in twenty-five years. Large increases were also notable for Cape Breton Island and Prince Edward Island. The pack increase was about 20,000 cases, and the prices received for the canned product were greater than any previous year. A portion of the pack was disposed of at \$50 and more per case of 48 pounds. While transportation, exchange, and the greatly

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unsettled world conditions appear to make the operations financially hazardous, the packers and dealers were again successful in gauging the demand for the product, and the ability of distributed markets to negotiate successfully for the product.

This industry demands the best possible protection, and every insistence should be laid on the observance of the regulations. The emphasis that is being placed on this requirement is having a good effect, and the regulations are being better observed than at any period since the rise of the industry. The investigations carried on by the department the past several years, and the educational features in connection therewith, have been of great value, and should be systematically continued.

The present regulations are, generally speaking, the most satisfactory yet devised.

(2)

COD AND HADDOCK.

The cod and haddock fisheries provide the chief food fishes, and offer fine opportunities for development. While the catches in Cape Breton Island, especially Inverness county, and also on the Nova Scotia side of the Bay of Fundy district, and on the coasts of New Brunswick and Prince Edward Island were not as large as usual, there was considerable increase in the catches landed on the Nova Scotia south shore ports, and also from the steam trawlers operating off Port Hood and Judique. The catch of the Lunenburg banking fleet was about 300,000 quintals, which is an increase of some 50,000 quintals over the preceding year. The prices of the dried product ruled high, averaging about \$12 per quintal.

It will be interesting to note that there has been little or no increase in the volume of the catch for some years, and this condition is generally deplored when it is pointed out that the markets can absorb a very greatly increased catch. It should be observed, however, that the deep-sea fisheries generally of the whole division, show a similar lack of expansion. Several considerations enter into the study of the situation:—

(1) Notwithstanding the very great improvement in small boat fishing, due to the replacing of the row and sail boat by the adoption of the modern motor-boat, there has been little or no increase in the number of vessels employed. Indeed, if it had not been for the operations of some five modern steam trawlers the catches of cod and haddock would have been insufficient to meet the demands of the fresh fish trade alone.

(2) The small prices secured for the fresh fish by the small boat and vessel fishermen affected the volume of the catch during the past year. While the cost of boats, gear and supplies, and also the cost of living has very greatly advanced, the prices secured by the fishermen on a large portion of the coast have increased only to a small degree. This has been true the past year in many sections of the New Brunswick and Cape Breton Island coasts, and has prevented a considerable number of the fishermen from diligently engaging in the work.

(3) The large stretches of coast without rail or steamboat facilities prevent advantage being taken of the best and most profitable markets. Also, the lack of adequate cold storage prevents the preservation of the catches to suit market and available transportation facilities.

On the other hand, it should be pointed out,—

(1) That our fishing population, even at the more advantageously located points, is not adequate to supply the demands for experienced fishermen, notwithstanding that at the favoured points the rewards of the industry are sufficiently great to tempt the enterprising and industrious. Such ports as Digby, Yarmouth and Lockeport find it difficult to steadily man the boats and vessels.

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Even Lunenburg, with its wonderfully prosperous slack-salted and dried fish industry, cannot greatly increase its fleet owing to the scarcity of men. Unless there is a rapid increase in the fishing population, and the building of winter fishing fleets, the industry can only be extended by the operation of additional steam trawlers.

(2) While it may reasonably be contended that the rate received by the fresh fish fishermen for the catches landed has not increased in proportion to the increase in operating expenses, it remains true that no single natural resource offers the workers better opportunities than does the fishing industry. The prices vary with the local conditions obtaining, and the fishermen who are located at points where there is little or no competition for their catches should be encouraged to either properly cure and market their catches; or,

(3) Cold storage facilities should be extended so as to avoid glutting the markets, and to enable the preservation of the catches until the market conditions are favourable for the disposal of the catches at good prices. For instance, the prolific deep-sea fisheries of Cape Breton Island cannot be very greatly developed until adequate cold storage is provided, and also until reasonably safe harbours and anchorages are constructed. The present catches, while large in volume and value, comprise a mere bagatelle as compared with the possibility of easy and rapid increase.

(3)

HERRING AND MACKEREL.

The above observations are pertinent to a large degree to the herring and mackerel fisheries. The catches of both species are larger than usual in many districts, especially in Cape Breton and Prince Edward Island. It should be noted that these increases were in the districts where the equipment was modern. It should also be noted that some districts reported that owing to the increase in the cost of supplies such as barrels and salt, the fishery was practically abandoned when sufficient catches were secured to supply the local demand for fresh and pickled herring. This condition is deserving of serious thought. The quality of the catches of Atlantic fish, suitable for pickling is as good as can be secured in the waters of any country, and it would appear extraordinary that with herring selling at from \$8 to \$14 a barrel, and mackerel as high as \$40 per barrel, that the comparatively small increase in the cost of salt, barrels, and other containers, should make it possible to profitably prepare the fish for market so as to take advantage of the high prices referred to, secured for properly packed and cured fish. When it is remembered, however, that as a rule our pickled herring and mackerel bring a much lower price than that received for the pickled product of other countries, the explanation is perhaps evident. But the query is obvious: Why is it that the prices secured for our pickled fish are often lower than similar products from other countries? The answer is that our fish are too often badly cured and badly packed, ungraded, in inferior packages, with the result that the product could not command the best prices, even when marketed under the most favourable conditions. Indeed, the conditions have been so bad that many dealers will not buy pickled fish for export in the original package, and packing is so inferior as to jeopardize not only the business reputation of the dealers, but also any possibility of profitable business. It is fortunate that during the past several years, the demand of the better class trade has resulted in the more reputable dealers insisting upon better methods, and consequently those dealers have no difficulty in disposing of large supplies at good prices. While the department has already endeavoured to improve conditions, there is much need of continued and systematic efforts, and it is hoped that regulations will be adopted governing the curing, packing and grading of mackerel.

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(4)

HERRING SARDINES.

The sardine industry, which is carried on extensively in the Passamaquoddy Bay district, experienced the worst season in its history; notwithstanding that enormous quantities of the fish visited the coast, the demand, owing to the extraordinary conditions, was small and the prices extremely low. In 1918 an abnormal pack of canned sardines was made on both sides of the boundary line. The large pack was in a great measure due to the requests of the Governments of both Canada and the United States for increased production of fish foods. After the signing of the armistice the demand for canned sardines almost entirely ceased, with the result that the 1919 season found the packers with a large proportion of the previous year's pack on hand. As a result, most of the canneries did not open until about the first of August last year, when the season was about half over. Ruinous prices were offered the fishermen for their catches and with the limited demand and the extraordinary large run in the weirs it was comparatively easy for the packers to buy the fish at their own prices. Ten dollars per hogshead was paid at the beginning of the season, and few were taken even at that small price. Later in the season the price was dropped to \$5 per hogshead, where it remained for the balance of the season. When it is remembered that the prices the preceding year ran as high as \$70 per hogshead, it will easily be understood that the industry last year was conducted at a great loss to the fishermen.

(5)

SALMON, SMELTS AND ALEWIVES.

These species of anadromous fishes are growing in value and importance each year. The smelt fishery has a marketed value of over \$250,000, while the alewife fishery is steadily growing in importance, the pickled product bringing as high as \$14 per barrel. The salmon fishery the past year was unusually poor, particularly during the first half of the season, although great numbers ascended the rivers late in the summer. The falling-off in the catches was most noticeable in the Restigouche, Miramichi, St. John, and Margaree districts.

It is quite evident that the fisheries referred to, and also the trout fishery, should be afforded the best possible protection. The salmon, alewife and smelt for their commercial value, and the trout, and also the salmon, for their sporting value. While it is possible that the wonderful extent and variety of our rivers and lakes make unnecessary any unusual activities in restocking, yet it should be remembered that our waters are visited each year, to the advantage of the population generally and to the communities in particular, by many thousands of sport fishermen. Also, the power and other industrial developments have seriously affected a number of the best fishing rivers and streams. Further, the very variety and extent of our rivers and lakes prevent, to a large degree, adequate measures being taken to protect the fisheries from depletion by illegal fishing methods. Every effort should be made to preserve and increase the supplies, not alone for the benefit of the recreation-seeking population, but also in the interests of the shore fisheries, as it is evidenced from investigation and observation, that a decline in the river fisheries is followed by a decline in the shore fisheries. Therefore, added importance is given to the protection of the river fisheries, from a distinctly commercial point of view.

(6)

SHELLFISH.

The oyster fishery of the famous Buctouche, New Brunswick, and Bedeque, P.E.I., and adjacent districts, while showing an increase over the preceding year, is deserving of serious consideration, as the condition of the fishery is becoming more unfavourable each year. The dual administration in Prince Edward Island prohibits any efforts of general value, while the mud digging carried on extensively by the farmers in the vicinity of the oyster areas for the purpose of securing fertilizer, is destroying the grounds. Indeed, the encroachments upon the live beds by the diggers, some three hundred of which are operated in Prince Edward Island alone, is constant, and unless very decided action is taken to prevent or limit their operations, the oyster fishery will soon become extinct.

The scallop fishery is confined to Chester basin and Mahone bay district in Nova Scotia, and is an important industry employing some 500 boats during the season. There is evidence that over-fishing is having its ultimate result and action should be taken to curtail operations so as to prevent any dangerous disturbance of the balance of nature. From information at hand it would appear that scallop beds exist in other sections of Nova Scotia and also in districts in New Brunswick and Prince Edward Island. These districts should be examined to ascertain the extent of the areas and their commercial value, in order that the growing demand for this shellfish may be supplied, and the industry developed.

EDUCATIONAL.

The growing agitation for technical education is a most encouraging sign, as there can be no doubt that the industry will not fully take its place in the fish trade of the world until those engaged in the industry are familiar with the best methods of catching, curing, packing, and manufacturing the product so as to take advantage of the demand of the domestic and export trade. It is also quite true that the rapid development of motor power for small boat and vessel propulsion is bringing about a very decided change in the operations of the fishermen. The motor-boat permits the taking advantage of prolific fishing grounds which hitherto have been too distant for successful exploitation by sail and row-boat fishermen.

Technical education has been under consideration by the department for some years, but it has not appeared practicable to deal with the question until definite provision had been made for a foundation to properly organize, equip, and maintain the necessary essential work. Generous provision has been made in chapter 73 of the Statutes of 1919, entitled the Technical Education Act, whereby the sum of \$11,000,000 has been provided to enable the Provincial Governments to initiate and organize technical schools suitable for the instruction of those engaging in these trades and callings. The Act provides an excellent opportunity for the technical education of the fishermen of these provinces, by arrangement between them individually and the Federal Department of Labour, and it would appear opportune for a beginning in this regard. I would propose:—

(1) *School of Navigation.*—The work of the School of Navigation now centred at the Halifax Technical College should be expanded by extension courses to be held at fishing centres throughout the division. There are a large number of uncertificated masters and mates of fishing vessels who should be enabled to perfect their knowledge and take the examinations necessary for the master's or mate's certificates. Also, with the development of the motor-boat there is wide need of a better knowledge of navigation in order that the fishermen operating considerable distances from the shore, be more generally equipped

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in this regard. At present, it is not possible nor practicable for the fishermen to attend courses at Halifax, and the proposal therefore to have well arranged short courses conducted at the various centres, at suitable seasons, would be of great advantage.

(2) *Motor Engine Mechanics*.—A knowledge of motor engine mechanics would be of great value. The introduction of the modern motor engine is having a wide influence on the industry. Too often, however, the operators of such engines, while ingenious and naturally quick to learn and apply "first aid," are under heavy loss caused by preventable breakdowns and repairs, besides using unnecessary supplies of gasoline. It is suggested, therefore, that courses conducted similarly to those referred to in connection with navigation, be prepared and held under competent men. This suggestion is apparently quite feasible.

(3) *Short Commercial Courses*.—While at present a considerable number of the fishermen prepare and market their own catches to advantage, a very considerable number are unfamiliar with the primary commercial processes, and therefore are not in a position to enter into the necessary negotiations for the marketing of their product. A short commercial course would be of value.

The three above-mentioned courses might be arranged as Technical College extension courses, and held in common, one with the other. I have consulted with Principal Sexton of the Technical College, who gave great encouragement to the proposals and expressed his willingness to co-operate in every possible way.

(4) *Fish Curing and Packing*.—Reference has already been made to the necessity of wider and more definite knowledge of the best and most remunerative methods for curing, packing and manufacturing the products of the sea. Careless and inferior methods prevent advantage being taken of the best markets and prices. While the "Meat and Canned Foods Act" and the "Fish Inspection Act" are wisely devised, it would appear that these alone, particularly as they are largely restrictive in their provisions, cannot possibly be effective in any large degree in influencing and educating the fishermen and dealers in the prime need of adopting the best methods in handling and preparing their products. Therefore it is necessary that competent instruction be given. It may be found difficult to adopt and carry on the necessary instructions in this regard until wider and more generous provision is made for the costs in connection therewith. It appears to me that the system of fishing bounties might well be changed, and the small bounties, large in the aggregate, given the fishermen could be used to better advantage in providing systematic instruction on the lines above suggested.

(5) *Fishery Officer Instruction*.—Under the reorganization of the Fishery Officer Service there is afforded a good opportunity of securing within a few years, a body of officials who are continually in close touch with all phases of the industry, and who may under proper training, become to a large degree, experts in connection with the fisheries of their respective districts. Under the reorganized service the positions of fishery officers become permanent, and their whole time is now required to be given to their duties and they are not permitted to engage in any other occupation. The arrangements that are being made to afford these officers systematic and well-defined courses of instruction, both technical and administrative, by gathering them together in convenient groups, at suitable places, from time to time, where lectures, demonstrations and experiments will be conducted respecting fish life and the various phases of the fishing industry, together with instruction in correct methods of administration of the fishery laws and regulations, and the numberless items that enter into this work should in a few years result in a staff of officers who will be able to efficiently serve the industry from the various standpoints.

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OBSERVANCE OF THE REGULATIONS.

The observance of the regulations is gradually improving from year to year, although much remains to be done before the conditions are reasonably satisfactory. It is, of course, difficult to adequately supervise the operations carried on along the extensive coast comprised in this division, and to afford protection against illegal fishing practices, too often prevalent in the multitude of rivers, streams and lakes. The lobster fishery has first demand, so far as the sea coast is concerned, and requires constant vigilance to prevent illegalities. The fishermen and cannery operators are, however, becoming quite alive to the necessity of protecting the fishery, and are, in a large measure, affording every assistance to the officers in enforcing the law. The fisheries of the river and other inland waters, are exceedingly difficult to thoroughly supervise and protect, as practically every river and stream is frequented by species of fish of importance, either locally or commercially, and are often relied upon to furnish needed supplies to the residents of the various localities. The conditions in the matter of pollutions from saw-mills, etc., are improving, and obstruction to the ascent of fish to the spawning grounds are being removed, or otherwise remedied.

There is great need of correct and systematic surveys being made of the inland waters, in order that intelligent and effective measures may be taken to preserve the fisheries. Action will be taken in this regard as expeditiously as possible.

I would express my appreciation of the interest of the inspectors and officers of the division. While many of the new officers are as yet unfamiliar with their duties, the evident desire of the returned soldier appointments to make good in their new positions is encouraging. Appreciation is also expressed of the assistance rendered by many public spirited citizens in the interests of the inland fisheries, and particularly of the kindly support and encouragement that the Victoria Protective Association through their secretary, Mr. George Kennan, have extended to the officers who have supervision of the sport fishing waters of Cape Breton.

REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA
FISHERIES OF QUEBEC, FOR THE YEAR 1919.

Notwithstanding that the fishing results of 1918 were barely average, the 1919 catch is even smaller, showing a decrease of over \$200,000 in value, despite the fact that the prices of all products of the fisheries have been steadily advancing. The decrease is due to various causes which affected the cod fishery in all sections of the district except at the Magdalen Islands; and to the complete failure in Saguenay county of the salmon fishery, which was also poor in the counties of Gaspé and Bonaventure. In Saguenay county some fishermen who used to catch from 400 to 500 salmon during the season, only succeeded in taking 40 or 50; and many did not think it worth while to leave their nets in the water during the whole time that fishing was permitted. The catch of all other kinds of fish was fairly good.

Owing to market conditions, the monetary returns have been sufficient to enable the fishermen to live until next season. The preceding years have been profitable, and the fishermen of the north coast and the Labrador consequently enjoy greater prosperity than formerly.

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As far as fishing methods are concerned the fisheries of the Gulf division still remain stationary, except for the growing use of motor-boats. In spite of all the campaigns of the last few years to popularize the fishing industry, it is noticed that young men especially seem inclined to go away to the cities, or to take up any other occupation than fishing. Although the population is increasing in certain important localities, there is a decrease in the number of fishermen and fishing boats, which is becoming alarming.

The principal fisheries of my district are those for cod, lobsters, herring, salmon and mackerel. Of these cod is the most important, exceeding in value all other kinds of fish together.

COD.

In the county of Saguenay cod appeared near Natashquan at the end of May, where they were found in very large quantities during the first weeks of June. From there, they went westward along the north coast, and reached the neighbourhood of Saguenay river, where they had not been seen for many years. Extraordinary as it may seem, they went up as far as the estuaries of certain rivers, and at Moisie many hundredweights were caught in the nets which had been set for salmon.

Their presence, in almost unlimited quantities at the beginning of the season, promised large catches, and fishermen were prosecuting the fishery in a most active manner when large schools of porpoises appeared on the whole of that coast. During June, July and August, these kept moving continually eastward and westward near the shore between the entrance of the St. Lawrence, and Natashquan. Fishery Officer N. A. Comeau, of Godbout, thinks that these schools are composed of from 15,000 to 18,000 porpoises, and from information received through telegraph offices, he observed that they were moving at the rate of 80 miles per day.

During the two or three days following each appearance (which took place three or four times monthly) cod rapidly disappeared, and it was impossible to catch any even in small quantities.

The oldest fishermen noticed, from time to time, some isolated porpoises in the gulf, but never saw nor heard of such large quantities appearing together. In supposing that each of these 15,000 or 18,000 porpoises consumed one hundred pounds of fish per day, we will have an idea of the enormous quantities that can be destroyed during a whole year, or even during a season.

About twenty years ago some naturalists, among whom was Mr. A. M. Montpetit, called the attention of the public to the enormous destruction of food fish by these porpoises; and they foresaw that, owing to their increasing number from year to year, there would come a time when they could not find food in the river, and would invade the gulf and there cause considerable damage to fisheries.

This anticipation was realized during the last season with the above consequences, which would have been disastrous if cod had not remained in such large quantities.

If it is admitted that these porpoises went into the gulf because they could not find in the river as much food as they needed, it is difficult to believe that the waters they have ruined gradually for many years will have time to restock themselves enough to permit those porpoises to live there permanently in future.

In Labrador, cod fishing was made impossible until the end of July, owing to the presence of ice which disappeared only late in spring, to be replaced almost immediately by other ice coming from the strait of Belle Isle. On the 8th July, following a strong eastern wind, a large field of ice was dispersed on an area of

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about 100 miles, and obstructed the coast from Blanc-Sablons to St. Augustin. During the last week of the month, after ice had been removed by a strong wind, cod showed itself in large quantities up to the 15th August, and big catches made up for the failure of the beginning of the season.

In the counties of Gaspé and Bonaventure, and more particularly on the coast of Baie des Chaleurs, cod was scarce until fall, and no reason was found for the same.

LOBSTER.

In Magdalen Islands, the catch for 1919 shows a falling-off, due to the fact that fishing was conducted with less activity than in the past year, more than to the decrease of lobsters, which have always been of a good size and which remained in quite large quantities. The rather small prices paid to fishermen induced the latter to quit before the end of the season on the 20th July, and to give their time to cod and mackerel fishing which were more profitable.

In the counties of Gaspé and Bonaventure, the results were practically the same as those of last year.

The lobster canning has been discontinued in Anticosti island. In Labrador, many owners of lobster factories obtain licenses without, however, keeping their factories in operation, so much so that in the county of Saguenay the pack was only one-fourth of that of 1918.

It is true that in these far localities, where the necessary material for lobster fishing is expensive and often hard to obtain, the benefits derived are very small. Owing to the present market conditions, fishermen get better results in cod fishing.

It is observed that the public interest is increasing regarding the protection of this fish. During the season there were ten prosecutions for illegal fishing in Magdalen Islands, and one in the county of Bonaventure.

HERRING.

Herring appeared on the 21st April in the Baie Plaisante and remained in normal quantity all around the islands during the month of May and the first days of June. The total catches there although less considerable than those of last year, were more than sufficient for the needs of smokehouses, as well as for the needs of cod and lobster fishing. As usual, they caught more than could be used. Foreign fishing boats, which come to the islands after bait, are becoming less and less numerous so that fresh herring is in less demand. The smoking industry, which started during the war, is being more and more expanded. From the number of new establishments which are built every year, one must conclude that those who are devoting themselves to the preparation of smoked herring are making large profits. In the counties of Bonaventure, Gaspé and Rimouski, herring is still used as fertilizer only, and as bait for lobster and cod fishing. In the county of Saguenay, it is rather scarce.

SALMON.

The production of salmon fisheries, which have been decreasing gradually for the last three years, is still falling off. Compared to that of the preceding season, the results of which were already bad, it shows a large decrease. This is due to the fact that in many localities the migration took place during the last days of July when the greater part of fishermen had stopped fishing. This late migration, which continued in August, was clearly demonstrated in Labrador where, at the beginning of the same month, a large number of salmon were caught in nets set for cod. I was informed by hunters, who visited certain rivers during the fall, that the spawning beds were full of parent salmon.

ANGLING WAS NOT A GREAT SUCCESS, EITHER.

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The unsatisfactory results are also partly due to the absence of caplan in all the northern part of the gulf, and the presence of ice until July in Labrador.

Some rivers on the south shore of the St. Lawrence should be better protected than they are. From reports received, poaching is still going on in the rivers Cap Chat, Ste. Anne des Monts and Mont. Louis. I could not, however, obtain direct information to enable me to prosecute the poachers.

MACKEREL.

Mackerel, which is caught in the gulf division, comes from Magdalen Islands; the counties of Gaspé and Bonaventure only supply small quantities. This fishing has been practically nil in the county of Saguenay for many years. No interest is taken and they do not even have necessary equipment. However, there are good indications that mackerel will reappear on this coast as well as in Chaleurs bay, where it was formerly found in such large quantities.

The production of the current year is inferior to that of 1918 which gave a result smaller than that of the last four years. This failure can be explained by the fact that serious damages were sustained by a large number of mackerel nets through a storm; the fishing, which was only beginning and showing good results, had to be abandoned.

It must be acknowledged that the last season was very quiet in all the stations of the district. There was no disorder worth mentioning, except a few violations of the law already mentioned in Magdalen Islands and in the county of Bonaventure. I wish to state again that in this last locality there is practically no officer for the protection of lobsters. I was informed during the winter that there was some live lobster trade going on after the 26th June. Mr. G. T. Annett has been looking after this section for the last two years, but as he is living at Gaspé, i.e., 200 miles east of the county of Bonaventure, he cannot reasonably be aware of what is going on. I am of the opinion that a permanent fishery officer should be appointed for Bonaventure.

The number of licenses issued in 1919 was smaller than in 1918. The difference is due to the fact that many Newfoundlanders who, as usual went to Labrador for codfishing, were prevented from doing so by the ice which remained near the coast up to the end of July.

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE
FISHERIES DIVISION, FOR THE YEAR 1919.

PROVINCE OF ALBERTA.

The district of northern Alberta shows a large increase in the catch of all kinds of fish, though the number of commercial and fishermen's licenses is not so large as in the year 1918. This increase may be attributed to the fact that the northern country is being rapidly settled, which means a larger demand for fish, the roads throughout the district improving greatly, enabling the fishermen to tap new lakes and to get their catch out of shipping points in good condition, increase in the number of dealers and improvement in their plants for the handling of the catch which allows of their handling more fish than formerly.

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In the district of southern Alberta, angling, which is the chief fishing, has fallen off greatly. The past summer was one of great drought in this district; many of the streams which in previous years carried sufficient water to make good trout streams, dried up, or became mere trickles of water. Many fish were lost in this way. A number of streams were closed by the department to all fishing for a period of two years. This I am sure will have a beneficial effect and lead to the natural restocking of those waters. Action has been taken to compel the screening of all irrigation ditches. This will, undoubtedly, save immense quantities of sporting fish. The commercial fisheries of this district are of very little importance, the Red Deer river being fished for coarse fish under fishermen's licenses, only seven licenses having been issued, the catch being one thousand pounds each of pickerel and suckers, all of which is used locally. During the year there were ten prosecutions for violations of the regulations, as follows:—

Fishing in Close Season.....	3
Fishing without license.....	1
Possession of undersized trout.....	3
Dynamiting streams.....	3

One case of obtaining license by false representation was noted. In this case the license was cancelled at once. The fishways are in good order. Reports made in connection with obstruction of streams by beaver-dams were investigated and it was found that in practically every case the obstructions were situated within forest reserves. The Southern Alberta Fishermen's Association was formed in Calgary, with which will be affiliated like associations in the southern district. The members of this association have given their assurance that they will co-operate with the department in every way to further the protection of the sporting fish. They have already made several valuable suggestions along this line which have been placed before the department.

PROVINCE OF SASKATCHEWAN.

In the northern portion of the province, there was a decrease in the quantity and value of fish taken, due to fewer fishermen operating in many districts, though in some districts there were more fishermen than in the preceding year, and in such districts, increased catches were obtained. Not only are no lakes showing signs of depletion, but the fish are improving in quality and size.

Developments in the fishing industry during the year include the erection of a large warehouse at Big river and a saw-mill at Dore lake, for the manufacture of fish boxes, building of new piers and wharves, and improvements in the roads leading to the lakes. Many fish camps have also been built to replace those destroyed last year by forest fires. The demand for frozen fish is growing and prices are firm. Local markets are well supplied and the surplus shipped to United States markets.

The district was well patrolled by an efficient staff of officers, and the close seasons have been well observed. There are officers residing at most points where saw-mills are operating, and no pollution of streams took place. All fishways are in good condition, and allow the free passage of fish at all seasons of the year.

In the district of southern Saskatchewan, the catch of whitefish in Lowes lake district is smaller than in the year 1918. This is accounted for by the overseer in charge, as owing to the strike in Winnipeg last summer, which stopped all shipments of fish, that being the chief market for the catch. Fish are as plentiful as in former years and there are no signs of depletion. It is reported that the whitefish have not spawned by the opening of the winter fishing season, December 15, the fish not having completed spawning until January 1. The same condition is observed in the Qu'Appelle lakes, and it would appear that a change in the date of the opening of the winter fishing season in these two districts would be beneficial.

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The Qu'Appelle lakes and lake Katepwe have this season been administered under an overseer as one district; which has worked out to advantage. The stocking of these waters with whitefish from the Qu'Appelle hatchery is this year showing results, some fine whitefish having been taken. Owing to the whitefish coming to maturity this year a change in the mesh of nets used for fishing was made from $4\frac{1}{2}$ inches as used in previous years to $5\frac{1}{2}$ inches; this has resulted in a smaller catch of coarse fish and tullibee, and was not popular with the fishermen; but in my opinion was the proper course and should be continued. The catch is not so large as in the previous year but this may be put down to the use of the larger mesh. One hundred fishermen are shown as operating. Of these, sixty-six fished from January 1, 1919, to the end of the fishing season, and thirty-four from December 15 to December 31, 1919, so that during the latter period there were only about half as many fishing as there were last year, between the same dates. This would account for a smaller catch, the best catches being taken during the first two weeks of the season. A number of fishermen who last year fished the Qu'Appelle lakes are now fishing in Lowes lake, where they can take advantage of the summer fishing. This would account for the falling-off in the number of fishermen operating on the Qu'Appelle lakes at the present time. There are very few experienced fishermen on these lakes, a fact which tends to reduce the catch. There were four prosecutions in the southern district: three for fishing within twenty-five yards of the mouth of a fishway, one for selling fish taken under domestic license. An increase of four icehouses is noted at Lowes lake, also an increase in the number of row-boats and gasolene boats at the same lake, the fishermen adding to their gear, from year to year.

During the year 1919, I visited practically all the northern lakes and was gratified to find the great improvements in the methods of handling the catch. Every effort was being made to put the fish on the market in perfect condition. The sanitation of the plants was good, everything being kept clean and in good condition. Great attention was being paid to the proper cleaning of the fish, and all utensils were kept perfectly clean. I also met all the fish-dealers and had many discussions with them in connection with the different phases of the fish industry. I found them in nearly every case, ready and willing to do what was necessary towards the improvement of the industry and the preservation of fish. I am pleased to say that there was no waste of fish at all, though this particular point was under the closest scrutiny by officers on the ground.

PROVINCE OF MANITOBA.

During the year just ended, the fishery service in Manitoba suffered the loss of three of its officers: Inspector J. A. Howell, whose death occurred on June 3; Guardian D. S. Daly, who died on the 13th of May; and Special Guardian William Overton, who died on the 5th of September.

Fishing throughout the province was, on the whole, as good as the previous year. Owing to low water in the Saskatchewan river and tributary waters, summer fishing in the northern district was practically a failure.

In District No. 1, lake Winnipeg, 783 licenses were issued.

In District No. 2, which includes the whole of the province with the exception of lake Winnipeg, 1,341 licenses were issued.

Only one prosecution took place in District No. 1, while in District No. 2 there were eight.

There has been in the past a tendency on the part of the fishermen, and fish companies, to use a smaller mesh net than that prescribed by law, but under the new reorganization it is hoped to put an end to this corrupt practice.

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Much assistance was rendered by the members of the Royal Northwest Mounted Police, also by the provincial police of the provinces of Alberta and Saskatchewan, especially in those districts where conditions make it possible for guardians to visit only occasionally.

Taken on the whole the regulations were well observed when the area of the districts administered is considered.

The officers under my supervision, with very few exceptions, performed their duties in a satisfactory manner.

REPORT OF CHIEF INSPECTOR, LIEUT. COL. F. H. CUNNINGHAM,
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA) FOR
THE YEAR, 1919.

Assistant Chief Inspector, J. A. Motherwell, Vancouver, B.C.; District No. 1—A. P. Halladay, New Westminster, B.C.; District No. 2—J. T. C. Williams, Prince Rupert, B.C.; District No. 3—E. G. Taylor, Nanaimo, B.C.

There was practically no change in the administrative and commercial aspect of the fisheries as compared with the previous year.

In District No. 3, three new canneries were in operation, one located at Sooke harbour and two on Barclay sound, one of these being erected for the purpose of canning herring, and subsequently the operations were extended to the canning of salmon.

The only administrative change was in the experimental direction of extending the areas over which purse seine licenses could operate, Knight inlet being the most important used in this direction. The result was satisfactory except that the licensees congregated at the most valuable fishing grounds, and it is quite possible that the fishing would have been too intensive at these places had it not been for the watchfulness of the fishery officers, who strictly enforced the regulations regarding fishing boundaries. To obviate this in future the fishing boundaries must be extended further from the mouths of the rivers, not with the intention of handicapping the operations but in pure fairness to both fish and fishermen.

The total pack of all varieties of salmon was 1,392,966 cases, as compared with 1,616,157 cases for the previous year. The decrease is largely due to the limitation in the packing of chum salmon, the decreased run of pink salmon owing to the disastrous freshets of 1917 which affected the spawning areas, and also to the necessity for the earlier annual close season on account of the unprecedented dry season. This early cessation of fishing affected the coho pack as the pink salmon had gathered around the mouths of the streams and were joined by the cohoes. If fishing operations had been allowed to continue it would have proved disastrous to both these species as in taking the cohoes, pinks would have been caught which had so deteriorated as to render them of no commercial value. This possibly was a hardship on both fishermen and cannerymen but it certainly was in the interests of conservation and will no doubt be realized in the run of 1921.

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Returned Soldier Citizens.—Owing to the necessity for the re-establishment of returned soldiers in the various avocations of life it was necessary to change the fisheries policy in the northern part of the province to meet these conditions. Consequently the number of salmon gill-net licenses issued was increased, thus enabling all returned soldiers desirous of doing so to take part in the actual fishing. The statement at the end of this report gives the number of returned soldiers who took advantage of this opportunity. Whilst many of these returned men were inexperienced in fishing they received assistance and advice with the result that on the whole they were successful, not perhaps to the extent they anticipated but the exaggerated benefits they were led to believe would accrue from the fishing planted the foundation for greater expectations than were warranted. Whilst these expectations were not fulfilled the general results were satisfactory to them.

DISTRICT NO. 1, (FRASER RIVER.)

The total pack of the Fraser river watershed amounted to 158,628 cases, as against 206,003 cases for 1918. The pack of sockeye was 29,628 cases, which was small even for an off year. It is encouraging, however, to note that this variety was in excess of 1918 by 12,779 cases. The quantity of salmon exported other than sockeye was greatly in excess of the previous year.

There was a very heavy run of sockeye during the month of October after the close season for the use of $5\frac{3}{4}$ inch mesh nets. These sockeye entered the streams tributary to Pitt lake, including the Lillooet river, Gilley creek, Silver creek and the Upper Pitt river, and large numbers found their way to the Coquihalla river and Kawkawa lake, which is tributary to the Coquihalla. There was also a large run to Cultus and Chilliwack lakes. These fish reached the spawning grounds in good condition and good results should follow in 1923. Whilst this run was late in 1919 there is nothing to prove it will always be a late run and may come as an early run in the year they return to their spawning beds.

From an inspection of the spawning grounds in the lower Fraser river watershed it is evident that the number of cases packed cannot be used as a basis for estimation as to the number of the different varieties that actually reached the natural spawning grounds. It is also pleasing to note that there is an encouraging improvement in the run to the Shuswap lake areas.

The regulations were fairly well complied with and the enforcement of clause 80 of the Fisheries Act, whilst perhaps a drastic measure, has had a salutary effect in minimizing the number of violations as compared with the number of licenses issued. There were eight gasoline launches used in patrolling the district, five being owned by the department and three under charter.

The services rendered by the fishery officers were of an energetic nature, impartial and satisfactory.

DISTRICT NO. 2.

Skeena River.—The abnormal run of sockeye to this river fully demonstrates what has been stated in previous reports that little is known of the natural life-history of the salmon. Notwithstanding the evidence obtained by the Fisheries Commission of 1917, which was on the lines of a depletion of this variety, yet the run to this river was the greatest since 1913, and resulted in a pack of 184,945 cases of this very valuable variety.

The run of spring salmon in the river was not as good as in 1918 but it must be remembered that there is a considerable drain on this run before it reaches the river owing to the intensive operations of the trollers outside, which naturally decreased the run to the river itself.

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The run of pink salmon was not good but the run of 1918 was the heaviest experienced for many years and there is no doubt but that the unprecedented freshets of 1917 were responsible for this as they must have affected most seriously the spawning beds.

The operations of returned soldiers on the Skeena river were of necessity limited as it is a hazardous area to operate in owing to the tides and the rougher elements in Chatham sound, but experience at other places will be of great assistance to those soldier citizens desiring to operate this year on this river.

Naas River.—It is regrettable to have to report that the salmon fishery of this river needs special attention if the run is to be continued. I have already drawn the attention of the department to the operations of American traps outside Pearce canal, north along the Alaska coast to cape Fox. These traps were most successful in capturing salmon heading for the Naas river and unless some international arrangement is agreed upon whereby these salmon will receive proper protection whilst passing through international waters this river as a producer of salmon and as a commercial asset is in the opinion of the officers of the department doomed.

Portland canal, which used to carry great quantities of salmon previous to the operation of these traps, shows a great depletion, as also does Observatory inlet and Alice arm, and further, the reports of the special provincial and Dominion officers show practically no spawning fish on the grounds in Meziaden lake. It is certainly in the interests of both the American and Canadian industry that immediate action be taken to ameliorate this condition of affairs.

Rivers Inlet.—The total pack amounted to 80,367 cases, of which 56,258 cases were sockeye. The pack would indicate that the run of this species was poor but the actual fact is that the run was heavier than it has been for years. The reason given for this is that the fish were small and passed through the $5\frac{1}{4}$ inch mesh nets. Another reason advanced is that the fish swimming deep passed under the nets, and I am of the opinion that the latter is nearer the solution than the previous one. The spawning beds of Owekano lake carried more sockeye than for years past. In addition to the hatchery being filled to capacity the natural spawning beds were exceedingly well seeded.

Smiths Inlet.—The run of all varieties of salmon to this area shows an improvement and the reports of special officers inspecting the spawning beds indicate that they were well seeded.

Reference is made to the unfortunate action of gill-net fishermen in destroying the seines operated under license in Quashela creek. The license for this area has been in force ever since the cannery was erected, some twenty-five years ago, and whilst during the past four or five years it has been a bone of contention it must be remembered that it is only of comparatively recent date that sockeye have been caught by gill-nets in this inlet in paying quantities. The department had given sympathetic consideration to the contention of both the licensees and the fishermen, and the decision reached was that the licensees should be allowed to operate the seine for a limited number of days during the season of 1919, after which season the license would not be renewed. The gill-net fishermen, however, took matters into their own hands and destroyed the seines.

There is no doubt that the discontinuance of the license for this creek will be the means of building up the run of sockeye salmon in this area to its former condition, as owing to the phosphorescent nature of the water in the inlet it is not possible for any number of gill-nets to seriously affect the run of fish, hence it may be reasonably expected that Smiths inlet will resume its place as one of the most important areas for sockeye salmon.

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Central Division.—This division includes Namu, Bella Bella and Gardner canal. The run of all varieties of salmon was fairly good, especially the run of what is known as "Creek" sockeye to the waters of the Bella Bella area. In this area the fall fish predominate and the operators must to a large extent depend upon these grades for their pack.

Bella Coola.—The run of all species of salmon was not good. The run of pink salmon was no doubt largely affected by the freshets of 1917, which were generally disastrous in this portion of the province. A number of returned soldier citizens have made their homes in Bella Coola on the land and depended upon the season's fishing to help them out. Consequently whilst it cannot be said they are discouraged still the results of their operations were not commensurate with their indefatigable efforts.

Queen Charlotte Islands.—On the east coast of these islands alternate runs of pinks and chums are usual; 1919 was the season for the latter variety and great quantities were caught and shipped in a green state to the Skeena river and south. The Moresby island fisheries also salted a large quantity. Returned soldier citizens hold the majority of the seining licenses in this area and on the whole their operations were successful.

Trolling.—The trolling industry is becoming more popular with the fishermen and there was a greater number of licenses issued than during the previous season, but the results were not so successful as in 1918 as spring salmon and cohoes were not so plentiful. This mode of fishing is receiving considerable attention from an economic standpoint. It is stated that quantities are hooked and lost and consequently die. It is also reported that spring salmon with large hooks imbedded in their mouths have been caught in gill-nets on the Skeena river. The American authorities are also considering the results of this style of fishing from a conservation standpoint. It is not fair to the fishermen that any value should be placed on rumours and it would be in the interests of all concerned if a reliable officer, who should if possible have scientific attainments, were placed for one season on the trolling grounds to report on conditions.

Halibut.—Prince Rupert is yearly growing in importance owing to this fishery. The fishermen operating out of this port had another successful year, the quantity, quality and price being maintained. Statistics will show that the catches were heavier than in 1918. The American catches and deliveries were far in excess of those from Canadian sources. Between five and six hundred carloads of Canadian and American halibut were shipped over the Grand Trunk Pacific railroad during the year, and it is stated that Prince Rupert will in a few years be the most important depot for halibut on the Pacific coast.

The international arrangement covering a close season for halibut should by the protection afforded materially assist in keeping up the supply of this species and enable Prince Rupert to take a foremost place as a distributing point of the halibut fishery.

Herring.—There is not much to be said on the herring fishery of this district as they are taken mainly for bait purposes. The Japanese make a success of this fishery by dry-salting and shipping to the Orient, whilst the white fishermen, owing to conditions, are not able to compete successfully. Halibut fishermen have in the past complained bitterly as to the lack of bait but this has been partially overcome by the establishment of herring pounds in the vicinity of Prince Rupert. During 1919 one or two were operated successfully and the number will be increased for 1920.

Protection.—During the season of 1919 conditions were such that it was possible to give a greater protection to the fisheries of this district. The steamer *Thomas Crosby* was again chartered. The department owns seven fair-sized gasoline boats and there were also twelve other boats under charter manned by officers who gave satisfactory service.

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DISTRICT NO. 3.

This district includes no sockeye areas of any great importance. The principal ones are a small run to Anderson lake through the waters of Barclay sound, to Kennedy lake through Clayoquot sound, also to Sauch-en-auch creek and Knight inlet, the most extensive sockeye river being the Nimpkish opposite Alert bay. The operators must therefore rely very largely on the fall fish for their packs. The run of sockeye to the Nimpkish river showed a great improvement over 1918 and conditions there are generally satisfactory.

The run of pink salmon over the whole district was small and whilst this was the off year for this variety in many places in the district the run was even smaller than expected, attributable no doubt to the 1917 freshets already referred to.

Reference must be made to the fishing conditions on the west coast of Vancouver island covering the area from cape Beale to Sombrio point. There were twenty-nine purse-seine licenses operating in this area of which fifteen were issued to returned soldier citizens. These men were not in a financial position to supply themselves with boats and nets consequently they had to make the best arrangements possible with those owning the necessary gear to operate their licenses. Whilst it is possible the best arrangements were made by them under the circumstances, still the conditions were not satisfactory and led to such intensive fishing that practically no salmon (chums) reached their spawning beds. This is a serious state of affairs as it means the cycle has been broken and the corresponding run of the 1919 fry will be practically nil. The aggregate catch was a fairly large one, but from an economic standpoint were of no value to Canada as the bulk of them were shipped in a green state to be canned in the United States.

To Barclay sound there was a tremendous run of dog salmon and from this quarter large quantities were also exported.

The run of sockeye to Anderson lake was fair and the run to the Somass river shows a decided improvement as during the past few years these fish have not been molested to any great extent. The cannery owned by the western packers and located at Shushartie was not operated this season, it being the object of the owners to allow all of the pink salmon to reach the spawning beds, and thus, if possible, build up a good annual run improving present conditions of a good run only every other year.

There was an increase in the number of purse-seines operated, all by returned soldiers, and whilst the returns may not have reached expectations they were in the majority of cases satisfactory.

There is nothing of special interest to report in connection with this district except in connection with trolling. This mode of fishing is on the increase and many complaints are received that in the early part of the season very small fish of the spring and blueback variety are to be found on the market. It is practically impossible to enforce any suggested regulation covering this unless all trolling is prohibited until later in the season. If this action is taken it prevents the capture of the early run of spring salmon which are most valuable as a commercial commodity. It has been suggested that only a certain sized hook should be used for the earlier months of the season which would prevent the capture of small fish, but such a regulation could not be enforced as it would mean placing an officer on every trolling boat to prove of any value. The suggestion already made of an officer with scientific attainments to investigate this mode of fishing would be most valuable.

Herring.—There has been a very large run of herring all over the district and some 30,000 cases have been canned in Barclay sound. Owing to market conditions the output of "Scotch cured" herring has been greatly limited as it is impossible to compete commercially with the product of the British Isles, and until transportation rates and labour conditions again become normal the

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outlook for this business is not good. There has, however, been a great impetus this season in the business of dry-salting, the increase being 138,870 cwts., which finds its way to the Orient. This business should be fostered and to keep up the quality all shipments should be inspected before leaving the country. It is also to be recorded that there is an increase in direct shipments by British subjects, which is satisfactory to the trade.

Reduction Works.—There appears to be a satisfactory increase in the manufacture of by-products, and whilst several oileries were established during the war and the product of oil received a ready sale this condition maintains in peace times even to a greater extent as the operations have generally improved and the whole dogfish is now being utilized for oil and for the manufacture of cattle and chicken food. Each establishment erected is an improvement on the last and there is no doubt but that these factories will be extended to cover the production of other products, such as the conversion of sharks, hair seals, sea lions and porpoises for commercial purposes.

As in other districts it was possible to increase and extend the protection service and it is pleasing to note that the infractions of the regulations are limited.

REMOVAL OF OBSTRUCTIONS.

Approximately \$30,000 was expended in connection with this important work. Over \$6,000 was spent in cleaning out streams tributary to Owekano lake, and which from reports of inspection subsequently made have been of great value in enabling the parent fish to reach their natural spawning grounds. Other important work was performed on Black creek, Rosewall creek, Cooks creek, Big Qualicum river, Nahwitti river, Okis Hollow creek, Coquihalla river and the Yakoun river, on Queen Charlotte Islands. Obstructions were also removed from smaller creeks. All of the places mentioned are now practically clear to the free access of salmon.

Work of this nature has its difficulties owing to the isolated locations and the necessity for transportation of men, material and provisions by special boats. A great deal of this work was necessary owing to the carelessness of loggers in not removing debris from the creeks when their work was completed and which formed the nucleus of obstructions, time and nature doing the rest. There is hardly a creek up which salmon go to spawn but which requires attention caused either by natural or logging operations. It is considered that a continuation of this class of work would be of immense value to the fishing industry.

Engineer McHugh has been indefatigable in his efforts to personally supervise this work as much as possible, but owing to the absolute necessity for his personal supervision of most of the work in connection with the construction of the Lakelse hatchery he was not able to give so much of his personal time to the removal of obstructions as could be wished. He has been given the assistance of a most efficient assistant who was able to give a good deal of the work personal supervision.

The general impression of those interested in the industry and in the perpetuation of the salmon as a continued commercial asset is that this work should be proceeded with as expeditiously as possible. This is being done, but it must be remembered that the amount of work to be accomplished is limited by natural conditions but the department and its officers realize the value of a clear waterway to the parent fish in reaching their spawning grounds and no opportunity will be lost in pushing the work as rapidly as the appropriation and other conditions will permit.

The fishery overseers have been instructed to keep a close supervision over the streams at the time the salmon are running in order to determine more definitely the seriousness of alleged obstructions, and they will also on streams which have been cleared see that the nucleus of any new obstructions is immediately removed. The labour used in this work was composed of practically all returned soldiers.

FISH CULTURE.

This is a very interesting topic at the present time when the value of this work is being criticised in some quarters. It appears to the undersigned that if these critics devoted the same energy in the direction of conservation that they do in condemning the actions of the department the fish hatcheries would become even of greater value than they are as they would be able to turn out a greater number of fry owing to the fact that there would be more parent fish on the spawning beds which Nature would take care of and the hatcheries would take care of the surplus eggs.

During the past season of 1919 there were five hatcheries operating on the Fraser river watershed, two on Skeena river, one on Rivers inlet, three on Vancouver island and one at Gerrard. Nine of these are devoted exclusively to the incubation of salmon eggs, the Cowichan lake hatchery partially so, while the Gerrard hatchery is a trout hatchery. The total distribution of sockeye fry during the spring of 1919 in the

Fraser river watershed was.....	34,100,000
Skeena river watershed.....	8,000,000
Rivers inlet.....	3,000,000
and on Vancouver island.....	4,606,550

In addition to this there was the usual number of spring, coho, hump-back and chum salmon fry distributed.

Good progress is being made in the construction of artificial rearing ponds in connection with the various hatcheries where the geographical situation will permit of this being done. Another improvement is the distribution of fry as much as possible on the natural spawning beds. At the Cowichan Lake hatchery the value of such rearing ponds has been demonstrated, thousands of spring salmon having been released after attaining a size of over two inches in length. There is no question but better results are assured by the liberation of fish having reached this size as they are stronger and in a better condition for self-preservation than the fry where the sac has only just been absorbed.

The officer in charge of the Harrison Lake hatchery has for the past two or three seasons been experimenting in the hatching of fish eggs by the gravel method. This system is not generally understood by the public but for information generally the procedure consists of placing fairly large stones in the bottom of a prepared box or can. A certain quantity of eggs are then placed in the receptacle, the eggs finding their way into the crevices between the stones. Smaller stones are then added, more eggs are placed in the receptacle filling up the newly-formed crevices and this is continued until as many eggs have been deposited as is considered desirable. A supply of water is arranged for by a space left in the box for this purpose and it finds its way through the larger stones at the bottom of the box, working up through the gravel and escaping at the top, thus keeping the eggs constantly damp. Eggs incubated by this means do not appear to fungus and when the fry are hatched out, the sac absorbed, the young fish then feed on the infertile eggs which may remain in the gravel. It is claimed that fry hatched out by this means retain to a greater extent wilder habits than those which are hatched in the open troughs in the hatcheries it being further claimed that hatchery fry become accustomed to their surroundings and lose a certain amount of that wild instinct which the gravel-hatched fry retain. It is very questionable if there is such a great difference in this respect as between the fry hatched out by the different systems—self-preservation is the first instinct of nature and unless the fry are kept sufficiently long to accustom them to artificial feeding it is difficult to conceive that the natural wild instinct should be lost in such a short time. However, fish culture, like everything else, is open to improvement and the system of gravel hatching will be extended and if it proves a more successful means of increasing the supply of fish than the present method it will certainly be adopted.

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I would like to refer here to the work of Mr. Alexander Robertson, officer in charge of the Harrison lake hatchery, who has been untiring in his efforts whilst an officer of the department to in all cases improve the present system of fish incubation, and he is deserving of great credit for the success he has met with. He has proved even with present experiments that the gravel system is a successful one and this system can be used to great advantage in stocking streams where the supply of parent fish is being depleted and where it is practically impossible to build a hatchery, or in isolated places to which the fry cannot be transported. The eggs can be taken there and incubation completed by the gravel system.

It is unfortunate that the hatchery operations should be the subject of the present criticism, especially by opponents who it is doubtful have ever been in close touch with the operations of a fish hatchery and who know little if anything of the procedure. They air their views in the press and because they may be interested in the canning business their views are accepted by the general public for this reason only, and the experience of men who have given their lives to the work of fish culture both in this and other countries has no value.

In a recent report to the New Westminster Board of Trade it was stated that the Harrison lake hatchery was blamed by many experienced fishermen for the depletion of this run, but the facts are that the only portions of the Fraser river watershed carrying a supply of parent salmon this year are where hatcheries are located. The run of sockeye to Morris creek, a tributary of the Harrison river, is increasing every year. The run of Sockeye to the Birkenhead river, a tributary of the Lillooet river was phenomenal. Why? Because of the output of fry from the Pemberton hatchery in 1915. The Coquihalla was not a sockeye river until fry were placed there from one of the hatcheries, the result being that this year shows an estimate of 75,000 parent fish on the spawn-ing grounds.

Some resolutions state that the hatcheries are a failure and yet the same resolutions blame the hatcheries for the run of small fish. There are small fish and large fish as the results of nature, so if the hatcheries are responsible for small fish they must also be given credit for large fish as well as it does not seem possible that only small fish would be the result of hatchery operations.

When one considers that the sockeye heading for the Fraser river are preyed upon by the traps in Juan de Fuca strait, the seines and traps in international waters miles of gill-nets for fifty miles of the Fraser river to Mission bridge, above Mission bridge by Indians and settlers, it is a miracle that there are as many fish coming to the Fraser river watershed as there are to-day, and it will be conceded by impartial judgment that the hatcheries are responsible to a large extent for the present although somewhat limited supply.

It is quite possible the system may be improved upon and every effort is being made to assist nature, but nature must also be assisted by those interested in the commercial life of the industry by allowing a sufficient quantity of parent salmon to reach the spawning grounds for the purpose of reproduction.

The resultant fry obtaining from the shipment of Alaska sockeye eggs transferred to the Harrison lake hatchery turned out very satisfactory. Fifteen millions of this variety were distributed in the various creeks emptying into Harrison lake. The fry were released as far up the creeks as it was possible to travel, thus placing them on or near the natural spawning grounds. Approximately a million and a half of the fry were held in the hatchery retaining ponds and troughs and attained a good size before passing into the lake. The fry when distributed were strong and hardy, and the shipment of eggs, the incubation and the liberation of the fry was a decided success.

REVENUE.

For several seasons past consideration has been given to the desirability of providing for an increased revenue more commensurate with the commercial value of the fisheries of this province. For the season of 1919 the license fees were increased as follows:—

Salmon cannery	licenses from	\$50. to \$500.
" purse-seine	"	\$75. to \$300.
" drag-seine	"	\$50. to \$150.
" trap-net	"	\$75. to \$500.
" gill-net	"	\$ 5. to \$ 10.

In addition to the above one-half cent per fish was collected on all salmon caught by purse- or drag-seines. A fee per case of canned salmon containing forty-eight pounds was also levied at 4 cents a case for sockeye and 3 cents per case for all other varieties. These fees, together with the amounts received for fines and the sale of confiscated articles, reached a total of \$253,997.60.

For the purpose of revenue collection the province was divided into two areas,—

- (1) The Fraser river, Howe sound, Vancouver island and the mainland adjacent thereto;
- (2) All waters north of cape Caution extending to the boundary line in Portland canal.

Owing to the vast area over which fishing operations are conducted the collectors had a great deal of travelling and detailed work to arrange for, but I am pleased to say they performed their duties in an efficient manner and for a first season the enforcement of the new revenue regulations was most satisfactory.

GENERAL REMARKS.

The desire of the returned soldier citizen to participate to a greater extent in the commercial industry created a difficulty in connection with the increase of the number of purse-seine licenses. It was felt that in the interests of conservation there were already sufficient, intensive fishing operations being conducted that the run of the various species of salmon could maintain, but it was also felt that the conditions warranted a greater encroachment on nature's supply, hence forty-six salmon purse-seine and drag-seine licenses were granted to returned soldiers only during the year. There were 150 applications and it could be well understood that the forty-six successful applicants could not be decided upon without creating great dissatisfaction amongst those who were unsuccessful. Whilst there may have been one or two licensees who did not fill expectations it was generally conceded that the best possible had been done considering the great number of applications and the small number of locations available.

Very few, if any, of these men had the financial means to operate their licenses and if they are to be encouraged in the direction of fishing as a means of earning a livelihood they must be given some financial assistance by the Government on the same basis as returned soldier citizens desiring to enter other fields of activity. Until this is done there must of necessity be a bartering in licenses which will not lead in the direction of building up a white fishing industry but will tend to place the actual operations of the licenses in the hands of others than the licensees. A white fishing population is desirable and this does not mean a fisherman who will fish for a few months during the salmon run but one who will follow the fishing the year round in the different seasons, viz., salmon, herring, halibut and cod, thus providing employment for the whole year and building up a thrifty and prosperous white fishing population.

During the season of 1919 a judicial investigation was held into the actions of the fishery officers in District No. 3. Charges of all kinds were filed against the officers and his Honour Judge Eberts was appointed by the Government to investigate the same. All evidence was taken under oath and it is satisfactory

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to note that not one solitary charge was proven, but it was an unfortunate waste of time and public money. One good feature, however, may have emanated from the investigation in so far as it set at rest in the public mind wild rumours of graft and maladministration of the fisheries in this province generally.

Attention is called to the large exportation of raw material in fish from this province to the United States. Such exportation is not in my opinion in the interests of the country as a whole. The manufacture of this raw material in Canada would result in a greater opening for labour and the distribution of money generally and would be a very strong factor in the procuring of foreign markets. Our competitors to the south have a very large home market for their canned goods and it is very questionable if the raw material were not obtained from Canada whether these foreign markets could be retained by them. It is claimed by the fishermen that an embargo on exportation would mean smaller results to them. This remains to be proved, as the manufacture of the raw material at home would mean the erection of new plants by foreign capital who would enter into competition with those already in the business, in buying fish, a greater competition amongst those now in the business which would be enabled by increased foreign trade, so that in my opinion the province and the Dominion has everything to gain and nothing to lose in manufacturing the raw products at home.

Whilst the manufacture of by-products is on the increase there is a wide field for extended operations. In certain localities there are large quantities of sharks, sea-lions, hair seals and porpoises, all of which can be used in the manufacture of leather and oil. The demand for these finished products is great, as is also the demand for chicken and cattle food manufactured at these establishments a growing one, and the field opens wide possibilities for enterprise.

The waters abound with all varieties of flatfish which are of great value as a palatable and nutritious food. This is another field open for enterprise and which should receive the special attention of the newly formed Publicity and Marketing Branch of the department.

In closing I wish to refer to the good work done by the Fisheries patrol steamer *Givenchy*, commanded by Captain Laird. This boat was one of the trawlers brought from the Atlantic coast and utilized in the Fisheries patrol service of this province. She is a most seaworthy boat and eminently suitable for work on this coast, and replaced the Fisheries patrol launch *Fispa*, which was transferred for service in District No. 3 under Inspector E. G. Taylor, replacing the *Alcedo*, sold by public auction.

The headquarters of the Dominion Fisheries Service were transferred in the beginning of the year from New Westminster to Vancouver. This transfer was only decided upon by the department after mature deliberation as the fisheries of British Columbia had been for so long associated with the Fraser river that there was a strong sympathetic feeling, but as the lines of progress had to be maintained there was no alternative and the transfer was subsequently authorized. The office is now installed in the Rogers block, a most up-to-date building on Granville street. The offices are commodious and a great convenience to both the staff and the public.

The past year has been a very strenuous one from the standpoint of the staff at headquarters and in the various districts. One and all have given the best of their ability to the service, great credit being due the district inspectors and fishery overseers generally for the satisfactory manner and willingness in which their duties were performed at all times, and it is to be regretted that the remuneration as provided by the Civil Service Commission is not more in keeping with the services required from these men and the responsibilities placed on them.

APPEN

NATURAL HIS

The following subjects are treated of:—

Lobster observations made at coasts of the Bay of Fundy, N.B., and at Investigations into the condition of the scallop at Mahone bay, N.S.

Remarks on the metamorphosis of the scallop.

Identification of a collection of specimens from Hudson bay waters, received

The following tabulation of measurements of lobsters is adjusted so that together with dates when the catches were made, can be seen at a glance.

A tabulation of Lobster measurements based on observa

1919.	St. Martins—13th May.			Mispec—19th May.			*Big Wood Island—28th May.		
Inches.	Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.
6									
6½									
6½									
6½									
7									
7½									
7½	1		1		1	1			
7½		1	1	2		2			
8							1	1	2
8½		1	1	1	4	5	2	1	3
8½	2		2	3	5	8	2		2
8½				3	2	5	1	2	3
9		3	3	1	5	6	5	3	8
9½		2	2	5	5	10	3	3	6
9½		1	1	7	4	11	3	1	4
9½	1	1	2	4		4	7	3	10
10		1	1		2	2	3	4	7
10½	3	3	6				5	2	7
10½	2	1	3				4	1	5
10½		1	1		1	1		1	1
11							3		3
11½	3	2	5					3	3
11½	2	2	4		1	1	1	1	2
11½	2	1	3				1		1
12	1		1				2	1	3
12½	1	1	2				1		1
12½		3	3	1		1		1	1
12½	2		2						
13	2		2						
13½	1	1	2						
13½	1		1						
13½									
14	1	2	3						
14½	1		1						
14½				1		1			
15		1	1				1	1	2
15½				1		1			
15½		1	1						
	26	29	55	29	30	59	45	29	74

*1 mutilated male, which could not be measured, may be added—46 males.
Mutilated male added—75 lobsters.

DIX 2

TORY REPORT.

coasts of the Magdalen Islands, P.Q.

from Rev. W. G. Walton, missionary at Fort George, Que.
their sizes for different localities at the Bay of Fundy and the Magdalen Islands,

tions made at the Bay of Fundy and the Magdalen Islands.

Havre Aubert—2nd July.			Entry Island—4th July.			Entry Island—9th July.			Entry Island—14th July.		
Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.
1	1	2		1	1						
	2	2	2	1	3	1		1	1		1
6	5	11		2	2						
7	6	13	2	3	5						
7	10	15	2	3	5	1	3	4			
7	11	18		1	1		3	4		1	2
9	9	18		6	6	2	4	4	3		3
12	12	24	5	4	9		4	5			
	10	18	3	4	7		4	5		2	2
8	4	12	1	1	2	2	2	2		1	1
8	5	13	5	3	8	2		2	2	3	5
9	6	16	2	6	8	1	3	4	1	1	2
4	2	6	3	7	10	6	9	3	3	2	5
7	4	11	2	5	7	4	4	4	1	2	3
6	2	8	2	3	5	2	2	4	3	4	7
2	4	6	1	2	3	3	1	4	1	3	4
1	2	3	1	3	4	1	1	2	1	3	4
4		4	2	3	5		2	3		2	3
4		4	2	1	3	1	1	2	1	3	3
2	1	3	4		4	2	1	3	1	3	3
4		4	2	2	4	1	1	2		1	1
				2	2						
3		3	2		2						
1	1	2		2	2						
1	2	3	2		2				1		
1	1	2							1		1
			1		1						

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The following denotes a catch, made on July 14, at Entry island, which was placed for a limited time at my disposal for examination before it was conveyed across the channel to Savage's cannery at Havre Aubert, Amherst island:—

64 males, 80 females=144 lobsters.
 Weight of males—69 lbs.
 Weight of females—61 lbs. Total—130 lbs.

The Havre Aubert and Entry island catches were practically from the same water areas.

There were no seed-lobsters among the females in any of the catches in the Bay of Fundy. The following shows the condition of the eggs of seed-lobsters, and of lobsters with the eggs just hatched off the swimmerets at the Magdalen Islands:—

Havre Aubert, July 2—		
90 females—2 with eggs hatched off.....	1, 9 in.....	eggs hatched off.
	1, 10½ in.....	eggs just hatched off.
	—	
	2	
Entry Island, July 4—		
59 females—6 seed lobsters.....	2, 9 in.....	eggs not ripe.
	1, 9½ in.....	eggs almost ripe.
	2, 10 in.....	eggs not ripe.
	1, 10½ in.....	eggs not ripe.
	—	
	6	
Entry Island, July 9—		
32 females—5 seed lobsters.....	1, 9 in.....	eggs almost ripe.
	1, 9½ in.....	eggs not ripe.
	2, 10½ in.....	eggs not ripe.
	1, 11 in.....	eggs almost ripe.
	—	
	5	
Entry Island, July 14—		
32 females—9 seed lobsters.....	1, 9 in.....	eggs hatching.
	2, 9½ in.....	eggs not ripe.
	1, 9½ in.....	eggs ripe.
	1, 10 in.....	eggs nearly hatched off.
	1, 10½ in.....	eggs hatching.
	1, 10½ in.....	eggs hatching.
	1, 10½ in.....	eggs hatching.
	1, 11½ in.....	eggs ripe.
	—	
	9	
Entry Island, July 14—		
80 females—1 seed lobster	1, 10½ in.....	eggs nearly hatched off.

There may be a question concerning the seed-lobsters in the first and the last given of the above. The former was made at the wharf of the cannery after the catch had been brought in, and I found two females with the eggs recently hatched off, but Mr. Savage could not absolutely assure me concerning the release of seed-lobsters; and the latter, as mentioned above, was examined just before being conveyed across the channel, and whilst I found a lobster in the catch with the eggs nearly hatched off, I was again unable to ascertain whether or not any seed-lobsters had been released. Cannerymen at the Magdalens will not knowingly receive seed-lobsters, therefore, possibly there were some released before the catches were brought in. This question is raised because by eliminating the two catches where there is doubt as to whether any seed-lobsters were released or not, the percentage of seed-lobsters among the females rises from about 7·9 to about 16·3. In other words, 23 seed lobsters (and the two with the eggs recently hatched off are included in them) in 293 females approximate 7·9, whilst 20 seed-lobsters in 123 females approximate 16·3.

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The following tabulation affords a comparison between the full-length and carapace measurements of 29 of the males, and 2 of the females in the Big Wood island catch. There were, as shown above, 46 males and 29 females, making a total of 75 lobsters in this catch. I seized an opportunity against the setting of the sun, and the holding of a campaign meeting in the school-house that night, to make those carapace measurements, but was unable to make carapace measurements of all the lobsters, and had, therefore, to desist in order to complete the full-length measurements of the balance. These measurements, however, were made very carefully, and, as a check on their exactness, with the help of a fisherman. My motive in making them was to establish a standard for the full-length and carapace measurements of the different sized lobsters.

The tabulation referred to here follows:—

Carapace.		Full Length—Inches.								
Males.....	3 $\frac{3}{4}$ in.	8								1
	4	8 $\frac{1}{2}$								1
	4 $\frac{1}{4}$ "	9	9	9	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	4
	4 $\frac{1}{2}$ "	9	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	7
	4 $\frac{3}{4}$ "	10	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{2}$		6
	5	10 $\frac{1}{2}$	10 $\frac{1}{2}$	11						3
	5 $\frac{1}{4}$ "	11	11 $\frac{1}{2}$							2
	5 $\frac{1}{2}$ "	11 $\frac{3}{4}$								1
	5 $\frac{3}{4}$ "	12	12	12 $\frac{1}{2}$						3
	7 $\frac{1}{4}$ "	15								1
										29
Females.....	.5 in.	10 $\frac{1}{2}$								1
	6 $\frac{3}{4}$ "	15								1
										2

During the summer I devoted considerable time to an investigation into the condition of the scallop at Mahone bay, Lunenburg county, N.S., as it had been reported to the department that the scallop fishery, owing to the heavy drain upon it was on the verge of being depleted. Reports of mine, placed on file, show what my findings were, and my recommendations for the conservation of that local industry, and I understand that the question of its proper protection is at present under consideration. The tenor of my reports (barring its use for catering purposes during the tourist season) emphasized the urgency of a rest for the scallop, in order to maintain the resource at its full productivity. My investigations were industrial (that is, they were carried on in the direct interests of commerce) and studies in natural history; and concerning the latter the following article already published in an issue of the "Canadian Field Naturalist" is here reproduced, under the title, "REMARKS ON THE METAMORPHOSIS OF THE SCALLOP (*Pecten tenuicostatus*)."

The scallop undergoes a metamorphosis. After hatching out, the young scallops attach themselves to rocks, scallop shells, or other objects, to which they remain as fixtures for a year or two. I can tell this from numerous young specimens obtained which possess an aperture through which a portion of the creature protrudes for attachment, and from a few specimens I came across which possess an elastic byssus for attachment, which protrudes from the so-called foot, and also from the margins of growth, the striations, and other points of structure which undergo a modification.

In the earlier stages the byssal attachment appears to agree with that of *Anomia* throughout the life-history of that genus. That is there is an aperture near the apex of the under valve through which a portion of the mollusk itself protrudes, so that it is directly attached to the object. But its agreement with *Anomia* in this respect is only temporary, for in time the scallop develops a byssus which is of elastic constituency such as the mussel (*Mytilus*) possesses

throughout its life-history. In the instance of the scallop again this provision is only temporary, for in time as it continues to grow, the byssus disappears, and the scallop is free and can then move about by the flapping of its valves.

Sometimes I was able to determine a stage of development from a single example. For instance, the fact that at one time in its life history the scallop develops an elastic byssus secreted from the foot for attachment to an external object. Two other specimens of the same character were obtained, but the byssus of one of them had been broken off in the raking, and it was found lying loose, and the other, a much smaller one, was also detached from the object.

Considering that the byssus always occurs on the same side of the scallop, and that the aperture of the more immature form extends to the margin of the valve, it is evident that the elastic elongation simply evolves from the original attachment, and that the aperture of the under valve as it becomes obliterated, leaves the scallop, except that it is now moored to an external object, otherwise free.

Judging from an illustration from Parker and Haswell, these zoologists seem to regard the pectens as hermaphrodite, as they show one part of the gonad in the same individual as male, and the other as female. But this is not so, at least in the case of the scallop. The sexes are distinct, and out of 209 scallops specially examined by me in my observational work, 100 were males, 108 females, and in one the sex was indeterminable. The gonad of this last mentioned was completely empty, not that I consider the scallop had spawned, for it was impoverished generally, and apparently in a sickly condition. I might have been able, had I known it at the time, to determine the sex by the digestive organs, but this was a later discovery. This fact, however, helps to emphasize what I say as to the sexes being distinct. The gonad of the male is cream coloured, and the stomach and its appendages grey, whereas the gonad of the female is a sort of brick red colour, and the stomach and its appendages brown.

The following is a list of the specimens of fishes and invertebrates collected in Hudson bay waters in 1919, with the localities where they were collected, and on what dates, by Rev. W. G. Walton, missionary at Fort George, P.Q. After examination the specimens were transferred to Dr. A. G. Huntsman of the Biological Department, University of Toronto.

- Sand Lance (*Ammodytus americanus*)—two specimens, Long Point, 15 miles east of cape Jones, August 5.
- Capelin (*Mallotus villosus*)—One specimen, Long Point, 15 miles east of cape Jones, August 3.
- Daddy Sculpin (*Myoxocephalus groenlandicus*)—Two specimens, Long Point, 15 miles east of cape Jones, August 5.
- Long-horned Sculpin (*Oncocottus hexacornis*)—One specimen, Long Point, 15 miles east of cape Jones, August 5.
- Common Stickleback (*Gastrosteus aculeatus*)—Fifteen specimens, near Great Whale river, July 26. Two sea-urchins in same wrapping.
- Nine-spined Stickleback (*Pygosteus pungitius*)—Two specimens, lake near Great Whale river, July 26.
- Common Stickleback (*Gastrosteus aculeatus*)—two specimens, Fort George river, James bay, September 8, ten young cyprinoids in same phial.
- Greenland Codfish (*Gadus ogac*)—two specimens, Great Whale river, July 20.
- Daddy Sculpin (*Myoxocephalus groenlandicus*)—Male, Great Whale river, July 22; male, Long Point, 15 miles east of cape Jones, August 3; female, Great Whale river, July 20.

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Long-horned Sculpin (*Oncocottus hexacornis*)—Female, Great Whale river, July 25. A stickleback in same wrapping.

Arctic Charrs, presumable varieties of the European Charr (*Salvelinus alpinus*)—Two specimens, Great Whale river, July 25; 2 specimens, Long Point, 15 miles east of cape Jones, August 1 and 2.

Round Whitefish (*Coregonus quadrilateralis*)—Three specimens, Great Whale river, July 22; 1 specimen, Long Point, 15 miles east of cape Jones, August 4.

Starfish (*Crossaster*) Great Whale river, July 25.

Starfish (*Asterias*) near Great Whale river, July 20.

Starfish (*Asterias*) Long Point, August 4, Amphipod in same wrapping.

Starfish (*Urasterias*) near Great Whale river, July 20.

Sea Cucumber (*Cucumaria*)—Two specimens, Long Point, August 4.

Amphipod—(Two specimens, and alcyonarian (*Alcyonium*)—10 miles northwest of Great Whale river, July 12. Caddis-fly tube (fresh water) in same phial

Invertebrates found loose among the material without labels or data:—

Two sea-urchins (*Strongylocentrotus drobachiensis*) one mussel (*Mytilus edulis*), and 3 crabs (*Hyas coarctatus*), 2 males and 1 female.

The following is quoted from my letter to Dr. Huntsman, when forwarding the specimens: "The Arctic charrs and the whitefish are not in good condition, but I regard the former as varieties of "*Salvelinus alpinus*", and the latter, having neither the form of *Coregonus clupeiformis*, nor the teeth of *C. Labradoricus* I provisionally regard as *C. quadrilateralis*. Until some of the Arctic salmonoids can be received in a fresh condition, it is hard to be certain of some specific differences. Of all our fishes the whitefishes are more involved in distinctions of varieties than are those of almost any other group, and I sometimes question that some are entitled to specific rank."

The following is quoted from Dr. Huntsman's letter to me when acknowledging receipt of the specimens:—

"The fishes seem to be quite interesting. So far as I have examined them up to the present, the sticklebacks appear to be the form which is only partly mailed, that is the one called *cuvieri* by Jordan and Evermann. The white fishes seem to belong to two different species, but I have not yet gone into them very closely."

Mention may also here be made of a specimen of the spring salmon from the Pacific coast, which was sent by Mr. R. C. W. Lett, Industrial and Colonization Agent, Winnipeg, for identification; and the following is quoted from my letter to him in identifying it:—

"It is a specimen of the quinnat, otherwise known as the spring salmon, or king salmon. It frequents both coasts of the Pacific and their slopes, and ranges from California to Behring straits and China, and ascends the large streams from the sea, sometimes making its way to great distances. It is, therefore, anadromous, and attains a length of from two to five feet."

A specimen also of the so-called mud-minnow (*Umbra limi*) was received from the provincial fishery officer of Arden, Ont., for identification, and a note descriptive of it and of the other species of *Umbra* is on file; and Overseer Torrie sent a specimen of a lobster, coloured blue, which was found at Little river, Digby county, N.S. The blue colour, as was to be expected, has since faded in the preservative fluid.

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APPENDIX 3.

List of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1919.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Acushla.....	70	23	4
Agnes.....	65	19	2
Albatross.....	167	32	4
Alice A. Wilson.....	16	8	6
Angeline C. Nunan.....	58	16	5
Angie B. Watson.....	36	14	2
Annie Belle.....	37	7	1
Annie M. Parker.....	100	20	2
Arethusa.....	88	25	4
Arthur James.....	99	20	2
Athlete.....	96	10	3
Authentic.....	250	30	1
Avalon.....	69	19	2
Bay State.....	81	25	8
Benjamin A. Smith.....	75	25	8
Bettina.....	120	17	2
Blanche F. Irving.....	14	7	3
Catherine.....	103	26	4
Catherine Burke.....	92	23	6
Cavalier.....	96	20	4
Commonwealth.....	93	21	4
Constellation.....	89	19	5
Corinthian.....	89	26	7
Corsair.....	71	17	1
Dawn.....	79	21	1
Desire.....	21	10	9
Edna G.....	67	18	1
Edith G.....	11	2	1
Eleanor.....	36	11	9
Elizabeth and Ruth.....	38	6	1
Elizabeth N.....	102	23	4
Elizabeth W. Nunan.....	48	17	11
Eliza L. Spurling.....	49	16	1
Elk.....	66	23	7
Ellen and Mary.....	97	23	2
Ellen T. Marshall.....	75	19	2
Elmer E. Gray.....	71	23	8
Elsie.....	98	21	4
Elsie G. Silva.....	50	20	7
Esperanto.....	91	22	3
Ethel B. Penny.....	56	16	4
Fannie Belle.....	16	7	10
Fannie Belle Atwood.....	81	20	5
Fannie E. Prescott.....	74	21	2
Fish Hawk.....	150	31	2
Flora L. Oliver.....	59	19	7
Florence.....	134	18	1
Fox.....	8	6	3
Frances S. Grueby.....	95	25	3
Genesta.....	53	19	3
Gertrude.....	61	19	1
Gertrude de Costa.....	61	19	2
Gladiator.....	75	7	1
Gladys and Nellie.....	52	18	3
Gleaner.....	23	9	7
Gloucester (trawler).....	250	31	5
Good Luck.....	55	19	11
Harmony.....	66	19	4
Harvard.....	72	19	3
Hazel R. Hines.....	79	21	13
Helena.....	40	17	2
Helen E. Murley.....	5	5	7
Henrietta.....	62	19	4
Henry L. Marshall.....	42	15	1
Herbert Parker.....	78	23	5
Hesperus.....	79	25	6
Hilda Silva.....	77	19	3
Hortense.....	43	19	2
Imperator.....	79	25	2
Ingomar.....	85	23	14

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Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
James and Esther.....	47	14	4
James W. Parker.....	96	23	5
James and Arthur.....	47	17	1
Jeanetta.....	66	19	3
Joffre.....	80	25	3
John D.....	12	6	6
John J. Fallon.....	60	21	6
Judique.....	89	19	3
Killarney.....	73	25	11
Kineo.....	71	19	3
Laverna.....	96	24	10
Leonora Silveira.....	51	21	5
Little Elsie.....	11	7	4
Lois H. Corkum.....	34	12	2
Louisa R. Sylvia.....	92	25	6
Louise Howard.....	116	10	1
Lucia.....	43	18	3
Mabel E. Bryson.....	23	7	4
Margaret.....	72	18	2
Margaret E. Haskins.....	70	18	2
Margie E. Turner.....	40	14	4
Marjorie Turner.....	41	14	3
Marion McLeon.....	11	8	4
Marshal Foch.....	64	25	2
Mary.....	93	24	1
Mary de Costa.....	62	17	9
Mary E. Harty.....	77	19	2
Mary F. Curtis.....	65	19	12
Matthew S. Greer.....	66	19	3
Mildred Robertson.....	75	18	3
Minerva.....	13	4	6
Monarch.....	83	19	7
Morning Star.....	85	24	3
Motor.....	17	8	5
Mystery.....	65	19	4
Natalie Hammond.....	67	21	4
Norma.....	65	23	5
Nyoda.....	28	11	2
Ralph Brown.....	67	19	2
Rattler.....	35	8	1
Reading.....	92	23	6
Rebecca.....	49	19	3
Regina.....	111	22	4
Republic.....	48	19	3
Restless.....	35	8	3
Rex.....	75	23	6
Richard J. Nunan.....	55	16	12
Robert and Arthur.....	67	19	10
Romance.....	96	23	6
Rose Standish.....	25	8	5
Rhodora.....	70	19	1
Russel.....	67	19	5
Ruth.....	49	17	3
Ruth and Margaret.....	97	25	4
Sadie M. Nunan.....	36	16	10
Saladin.....	89	19	3
Sea Bird.....	169	31	6
Senator.....	74	8	1
Sibyl.....	18	7	2
Silveira.....	51	19	1
Squanto.....	81	23	17
Somerville.....	82	22	3
Stiletto.....	136	19	4
Sunapee.....	18	8	5
Teazer.....	59	19	5
Thelma.....	28	12	2
T. M. Nicholson.....	90	23	3
Valentina.....	28	12	16
Victor.....	75	20	2
Vida McKeown.....	83	20	2
Viking.....	34	16	1
Walham.....	47	17	2
Waldo L. Stream.....	85	21	1
William H. Ryder.....	45	18	2
Totals, Atlantic.....	9,815	2,588	622

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List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1919.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Active.....	25	6	1
Adelphi.....	21	3	15
Adeline.....	6	4	9
Agnes.....	17	5	3
Alameda.....	4	4	10
Alaska.....	44	15	10
Albatross.....	40	13	14
Albatross.....	16	5	24
Alfred.....	13	3	3
Alice B.....	13	5	4
Almara.....	49	6	1
Alpha.....	12	5	4
Alten.....	43	15	11
Alvilda.....	18	13	4
America.....	25	5	3
Anna J.....	22	5	5
Anna J. Larsen.....	25	11	5
Annie.....	11	4	2
Apache.....	77	5	3
Arctic.....	29	11	2
Atlantic.....	25	11	5
Atlas.....	31	11	7
August.....	19	4	2
Augusta.....	19	5	3
Aurora.....	13	5	2
Baldy.....	7	3	10
Baltic.....	24	5	2
Bartalome.....	4	3	10
Bear.....	31	5	1
Beaver.....	17	5	5
Behring Sea.....	44	5	12
Blue Sea.....	23	8	20
Bravo.....	4	3	13
Bring Gold.....	12	5	11
Brothers.....	13	5	9
Cape Spencer.....	11	5	4
Carlisle.....	10	2	1
Cascade.....	14	2	16
Cedric.....	7	3	1
Celtic.....	4	2	1
Charlotte B.....	15	3	1
Chimera.....	9	4	4
City of Blaine.....	26	4	1
Clara.....	6	5	19
Cleopatra.....	33	5	8
Coaster.....	10	2	1
Commonwealth.....	60	16	3
Companion.....	10	3	2
Constance.....	53	15	3
Constitution.....	39	13	10
Convention.....	20	5	15
Cora.....	4	3	8
Corona.....	19	11	9
Crescent.....	14	5	4
Daisy.....	18	8	7
Deep Sea.....	35	5	4
Delphinium.....	20	5	4
Democrat.....	27	6	8
Dick.....	10	4	3
Dip.....	4	3	14
Director.....	12	4	13
Dolphin.....	7	4	13
Dorothy Hulbert.....	20	8	12
Eagle.....	15	6	7
Eastern Point.....	4	3	15
Eclipse.....	24	6	5
Eidsvold.....	15	5	14
Einer Beyer.....	92	6	3

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Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times entered.
Eleanora.....	16	5	1
Elfin.....	4	2	3
Emblem.....	4	3	5
E. Neilson.....	15	3	4
Ethelyn.....	4	2	5
Eureka.....	4	2	2
Evolution.....	17	5	7
F. C. Hergert.....	15	5	1
Fenwick.....	27	4	1
Fisher.....	14	6	15
Flamingo.....	13	5	3
Flattery.....	10	3	8
Flivver.....	3	2	3
Fortuna.....	21	5	5
Forward.....	18	5	2
Fram.....	4	3	4
Frances E.....	58	5	6
Freedom.....	28	5	4
George Washington.....	13	2	6
Gilford.....	12	4	1
Gjoa.....	13	5	10
Glacier.....	10	5	4
Golden Gate.....	23	4	2
Goney.....	12	5	7
Grace J.....	3	2	1
Gradac.....	22	7	1
Grayling.....	16	5	15
H. & R.....	4	3	23
Hanna.....	11	5	2
Happy.....	17	4	2
Harder.....	8	3	1
Harvester.....	15	5	3
Hattery.....	10	4	1
Helena.....	18	5	14
Helen D.....	8	5	1
Helgeland.....	56	15	6
Hellenic.....	24	6	2
Hergert.....	15	5	10
Hilda.....	10	3	12
Hillside II.....	28	4	4
Holdal II.....	4	3	10
Home.....	9	3	1
Hulda.....	6	3	1
Husky.....	19	2	3
Ida.....	7	2	2
Imperial.....	23	8	10
Jean.....	9	2	2
Jeannie.....	14	4	1
Jennie.....	14	4	1
Jennie F. Decker.....	16	8	9
Jessie Island.....	19	3	1
Johanna.....	23	5	3
J. P. Todd II.....	12	4	3
June.....	15	5	4
King and Wing.....	97	22	6
Kingfisher.....	14	4	2
Kingsmill.....	38	6	3
Klatawa.....	15	3	2
Kodiak.....	38	13	16
Lansing.....	16	5	10
La Paloma.....	14	11	12
Lebanon.....	14	5	14
Lenore.....	14	4	6
Liberty.....	44	15	18
Lincoln.....	17	4	11
Lister.....	14	5	1
Livingston.....	24	6	8
Louise.....	16	6	7
Lovera.....	4	4	1
Lumen.....	10	4	10
Lummi No. 2.....	38	5	4

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Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times entered.
Mabel A.....	22	5	5
Madeline J.....	21	5	4
Magdalene.....	27	4	2
Maghuel.....	6	3	15
Malolo.....	9	11	11
Margaret J.....	10	4	4
Mars.....	14	4	1
Mary.....	16	8	14
Mildred.....	19	8	9
Missawit.....	36	2	1
Miyako.....	18	3	2
Morengen.....	17	5	1
Morzhovia.....	62	6	4
Myrtle.....	9	4	13
Navigator.....	13	4	8
Nellie.....	4	3	1
New England.....	70	32	4
Newcastle No. 6.....	64	5	2
Niagara.....	13	4	14
Nidaros.....	13	5	17
Nomad.....	15	5	4
Nora.....	16	2	2
Norland.....	19	5	3
Norma.....	6	3	14
North.....	9	3	11
North Cape II.....	4	3	10
North Star.....	12	5	8
North Western.....	19	5	1
Olympic.....	30	11	15
Omaney.....	34	14	8
Onah.....	18	5	13
Orient.....	48	13	9
Pacific.....	26	11	6
Panama.....	24	13	19
Panther.....	30	4	2
Pauline.....	14	5	5
Pershing.....	18	5	7
Petrel.....	4	3	1
Pioneer.....	48	15	11
Pioneer III.....	26	5	2
Polaris.....	45	15	10
Presho.....	14	5	9
President II.....	23	3	2
Progress.....	6	2	7
Rainier.....	4	3	9
Republic.....	51	15	11
Reliance.....	14	4	13
Restitution.....	24	5	8
Road Amundsen.....	16	4	1
Rolf.....	6	3	1
Rolfe.....	10	5	3
Roosevelt.....	13	5	4
Rosario.....	16	5	11
Royal.....	15	4	1
Rush.....	254	14	4
S. & S.....	4	3	11
Sadie K.....	13	5	7
Sammy.....	8	3	3
San Francisco.....	33	2	1
Sarah.....	9	2	1
Saturn.....	4	3	5
Scandia.....	79	17	7
Scout.....	5	2	1
Seattle.....	55	15	17
Senator.....	11	11	10
Seymour.....	44	14	10
Shamrock.....	21	4	4
Signal.....	13	4	2
Siloam.....	16	5	15
Sitka.....	50	16	7
Speculator.....	9	4	23
Spencer.....	17	5	3

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Name of Vessel.	Tonnage.	Number of Men In Crew.	Number of Times Entered.
Stamsund.....	14	3	1
Standard.....	10	2	1
Star.....	12	3	8
Stranger.....	6	3	1
Success.....	4	4	2
Sumner.....	34	8	5
Sunrise.....	24	2	1
Sunset.....	24	4	2
Sunwing.....	15	5	3
Superior.....	16	5	4
Swiftsure.....	22	5	14
Taboo.....	16	3	1
Tahoma.....	18	10	14
Tatoosh.....	24	5	13
Texas.....	16	5	6
Thelma.....	4	3	2
Tillicum.....	21	5	12
Titanic.....	9	4	1
Tom and Al.....	57	15	13
Tordenskjold.....	39	13	14
Totem.....	8	2	1
Treo.....	28	5	1
Trio.....	19	8	3
Tyee.....	89	20	10
Tyu.....	12	4	1
Tzartoos.....	22	6	6
U. & J.....	19	3	2
Una Mae.....	26	2	1
Uranus.....	15	5	4
Valid.....	8	3	5
Vansee.....	43	15	11
Venus.....	3	3	14
Venus.....	25	6	2
Vesta.....	13	5	12
Vienna.....	17	5	17
Viking.....	10	4	18
Vivian.....	9	3	2
Volunteer.....	21	5	19
Voyageur.....	3	3	1
Washington.....	24	11	9
Wee Wee.....	4	2	1
West Coast.....	22	5	6
Westfjord.....	17	6	5
White Star.....	17	4	7
Wilhelmina.....	17	5	4
Wilson.....	19	5	7
Wireless.....	17	5	7
Woodrow.....	23	5	5
Yakutat.....	41	15	10
Yellowstone.....	22	5	9
Zilla May.....	56	13	11
Totals, Pacific.....	5,552	1,523	1,700

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APPENDIX 4.

FISHERIES EXPENDITURE, 1919-20.

		Appropriation.	Expenditure.
		\$ cts.	\$ cts.
Salaries and disbursements, F.O.....	\$294,492 22		
Fisheries Patrol Service.....	291,246 27	600,000 00	591,804 11
Oyster Culture.....	6,065 62		
Fish Breeding.....		365,000 00	305,476 75
Deep Sea Fisheries and transportation fresh fish.....		100,000 00	79,581 75
Building Fishways.....		30,000 00	29,831 72
Legal and Incidental Expenses.....		4,000 00	1,840 76
Fisheries Intelligence Bureau.....		5,000 00	1,614 85
Inspection of pickled fish.....		15,000 00	7,238 28
Marine Biological Board.....		26,000 00	26,000 00
Scientific investigation into fisheries.....		10,000 00	
Compassionate Allowance to Mrs L. F. Ogilvie.....		1,000 00	1,000 00
Totals.....		1,156,000 09	1,044,388 22
Fishing Bounty.....		160,000 00	155,136 70
Paid out of Consolidated Revenue Fund.....			16,556 93

Provinces.	Salaries and disbursements of F.O.	Fish Breeding.	Fisheries Patrol Service.	Building Fishways and Clearing Rivers.	Inspecting Canned and Pickled Fish.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	64,897 03	16,243 01	31,014 36	1,727 65	2,743 80
P.E. Island.....	11,236 85	2,918 40	4,346 23		
New Brunswick.....	53,756 11	34,275 01	17,470 80		2,760 62
Quebec.....	8,405 17	13,125 26	33,679 99		
Ontario.....		75,479 78	188 83		247 00
Manitoba.....	8,615 30	26,379 94	21,176 75		
Alberta.....	18,994 11	7,203 06			
Saskatchewan.....	15,633 19	4,147 16			
British Columbia.....	92,073 18	111,918 01	167,180 77	27,981 59	992 55
Yukon.....	11 65				
General Account.....	20,869 63	13,787 12	16,188 54	122 48	489 31
Totals.....	294,492 22	305,476 75	291,246 27	29,831 72	7,238 28

FISHERIES REVENUE, 1919-20.

Provinces.	Amount Collected.	Refunds.	Net Amount.
	\$ cts.	\$ cts.	\$ cts.
Ontario.....	1,421 80		1,421 80
Quebec.....	8,085 78		8,085 78
New Brunswick.....	16,461 02	20 00	16,441 02
Nova Scotia.....	10,220 28	7 00	10,213 28
Prince Edward Island.....	4,781 68	40 00	4,741 68
Manitoba.....	12,154 17	15 00	12,139 17
Saskatchewan.....	4,336 00	15 00	4,321 00
Alberta.....	8,318 85	5 00	8,313 85
British Columbia.....	270,899 41	201 00	270,698 41
Yukon.....	215 00		215 00
Total.....	336,893 99	303 00	336,590 99

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APPENDIX 5.

The following is a statement showing the number of licenses of the different kinds, issued in *each* Province during the 1919-20 Season:—

QUEBEC.

Kind of License—	No. Issued.
Lobster Packing.....	53
Lobster Extensions, 19.....	
Lobster Fishermen's.....	568 (6 cancelled)
Fish Cannery.....	3
Salmon Fishery.....	159 (4 cancelled, 1 free)
Herring Trap Net.....	46 (1 cancelled)
Cod Trap Net.....	274 (6 cancelled)
Rental of Salmon Fishing Privileges in the estuary of St. John River,.....	1
	<hr/> 1,103

PRINCE EDWARD ISLAND.

Lobster Packing.....	191
Lobster Extensions, 92.....	
Quahaug Fishery.....	14
Fish Cannery.....	10
Lobster Fishermen's.....	1,903
Smelt Gill Net.....	171
Smelt Bag Net.....	244 (2 cancelled)
Oyster Fishery.....	196
Trap Net.....	7
	<hr/> 2,736

NOVA SCOTIA.

Lobster Packing.....	152 (1 cancelled)
Lobster Extensions, 112.....	
Special Angling Permits.....	264 (4 free)
Fish Cannery.....	25
Lobster Fishermen's.....	8,164 (1 cancelled)
Smelt Gill Net.....	259
Smelt Bag Net.....	175 (1 cancelled)
Oyster Fishery.....	150
Trap Net.....	233 (2 cancelled)
Salmon Net.....	21
Drag Seine.....	141 (1 cancelled)
Herring Weir.....	103
Trap Net Extensions, 1.....	
Scallop Fishery.....	257
Lobster Pound.....	8
Lobster Pound Certificates, 192.....	
	<hr/> 9,952

NEW BRUNSWICK.

Lobster Packing.....	163
Lobster Extensions, 29.....	
Fish Cannery.....	8
Lobster Fishermen's.....	1,938
Scallop Fishery.....	2
Clam Permits.....	5
Herring Weir.....	803
Bass Gill Net.....	53
Quahaug Fishery.....	96
Salmon Fishery.....	523
Smelt Gill Net.....	110
Smelt Bag Net.....	2,479 (24 free).
Oyster Fishery.....	332
Bass Fishery.....	29 (6 free)
Sturgeon Fishery.....	3
Salmon Net Permits.....	91
Whitefish Fishery.....	5
Lobster Pound Licenses.....	3
Lease of Dark Harbour, 1.....	
	<hr/> 6,643

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MANITOBA.

Special Fishery.....	1,951 (4 cancelled)
Settler's Permits.....	299 (1 cancelled)
Commercial Sturgeon.....	87
Domestic Sturgeon.....	Nil.
Receipts, \$11.....	

2,337

SASKATCHEWAN.

Fish Cannery.....	Nil
Commercial and Fishermen's.....	672 (4 cancelled)
Domestic.....	179 (18 cancelled, 1 free)
Indian and Half-breed.....	673
Commercial Sturgeon.....	16
Domestic Sturgeon.....	9
Angling Permits.....	9

1,558

ALBERTA.

Angling Permits.....	4,745 (2 cancelled, 6 free)
Commercial and Fishermen's.....	676 (3 cancelled)
Domestic Fishery.....	194 (19 cancelled)
Indian and Half-breed Permits.....	313
Commercial Sturgeon.....	Nil
Domestic Sturgeon.....	Nil
Receipts, \$1,700.....	

5,928

BRITISH COLUMBIA.

Special Angling Permits.....	68
Abalone Fishery.....	Nil
Fish Cannery.....	17
Indian Permits.....	193
Gill-Net, Drift-Net or Drag Seine Licenses operated in conjunction with power boats.....	367
Smelt or Sardine.....	84 (3 cancelled)
Crab Fishery.....	107
Salmon Cannery.....	82
Salmon Trap Net.....	21 (1 cancelled)
Salmon Purse Seine.....	141 (2 cancelled)
Com. Fishery for Salmon Trolling.....	2,260
Salmon Drag Seine.....	104 (2 cancelled)
Sturgeon Fishery.....	1
Herring or Pilchard, Gill-net or Drift-net.....	67
Herring Drag Seine.....	3
Herring Purse Seine.....	53
Salmon Gill-net or Drift-net.....	4,613 (18 cancelled)
Reduction Works Licenses.....	12
Herring Drag Seine or Purse Seine for Halibut fishing vessels.....	Nil
Boat Licenses to buy fresh salmon from fishermen.....	205
B.C. Licenses to persons engaged in cold storage or fish packing to buy fresh fish from fishermen.....	162 (8 cancelled)
Whale Factory.....	3

8,563

YUKON TERRITORY.

Yukon Special Fishery.....	16
	16

Total Number of Licenses issued..... 38,836

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The following is a statement showing the number of prosecutions, confiscations and sales which took place in each province, during the 1919-20 season.

Province of	No. Prosecutions.	Revenue Received.	No. Confiscations.	Revenue from Sales.
		\$ cts.		\$ cts.
Quebec.....	14	590 00	5	117 00
Prince Edward Island.....	52	1,423 00	17	607 57
Nova Scotia—				
District 1.....	1	20 00	8	5 50
District 2.....	27	323 00	22	111 10
District 3.....	11	93 50	10	34 75
New Brunswick—				
District 1.....	30	355 00	49	62 00
District 2.....	25	505 00	58	685 81
District 3.....	40	380 00	26	141 50
Manitoba—				
District 1.....	1	40 00	3	432 00
District 2.....	8	270 00	7	403 17
Saskatchewan.....	20	180 50	16	135 00
Alberta.....	27	112 50	11	128 00
British Columbia—				
District 1.....	72	862 50	23	3,122 31
District 2.....	42	1,060 00	26	3,405 50
District 3.....	20	545 00	22	356 40
Yukon Territory.....	Nil.	Nil.	Nil.	Nil.
Ontario.....	1	10	1	353 90
Total.....	391	6,770 00	304	10,101 51

FIFTY-FOURTH
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1920

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

THOMAS MULVEY
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1921

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-fourth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, May, 1921.

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DEPUTY MINISTER'S REPORT

To the Hon. C. C. BALLANTYNE,
Minister of Marine and Fisheries.

SIR,—After a separation of six years, the Fisheries Branch was again attached to this department, and I have now the honour to submit the fifty-fourth annual report thereof. By Order in Council of the 16th of June, 1914, the Fisheries Branch was transferred from the administration of this department to that of the Naval Service, such transfer to take effect on July 1, 1914. At that time the work of that department was comparatively light, but owing to conditions that were brought about by the war, it was considered that the duties thereof will in future require the full attention of the deputy minister; also experience showed that there is really nothing in common in the duties of the Department of the Naval Service and the Fisheries Branch. On the other hand, as the shipbuilding programme of this department would soon be completed, it was found feasible for the undersigned to assume, under your direction, the responsibility for the administration of the Fisheries Branch. Hence by Order in Council of May 29, 1920, the administration of that branch was retransferred to this department to date from July 1 last, or, as above stated, after a separation of exactly six years.

It is also of importance to note that by the terms of the Order in Council retransferring the branch the title of the chief administrative officer thereof was raised from that of "General Superintendent of Fisheries" to that of "Assistant Deputy Minister of Fisheries."

This report deals with:—

- Investigations into fish curing methods.
- Utilization of fish offal.
- Reorganized service.
- Change of policy in British Columbia.
- Publicity, transportation and marketing.
- Scouting for mackerel.
- Jurisdiction over the fisheries.
- International questions.
- Investigations into the natural history of the lobster.
- Fishways.
- Inspection of fish.
- Cannery inspection.
- Fisheries statistics.
- Fishing bounty.
- Fish culture.
- Oyster culture.
- Biological stations of Canada.
- Review of the fisheries of 1920.

Appendices to the report include the following:—

1. Reports of Chief Inspectors of Fisheries.
2. Entries in Canadian Ports by United States Fishing Vessels.
3. Report of Fisheries Engineer.
4. Fisheries Expenditure and Revenue.
5. Summary of Licenses issued.

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INVESTIGATIONS INTO FISH CURING METHODS

While the curing of fish by salting has been going on for centuries there has been a most surprising lack of exactness in the operations, and a want of knowledge as to the causes of certain results. For instance the "reddening" particularly of codfish is an old difficulty from which cause serious losses have been experienced; but all the causes and how they can be avoided are not known. Investigations have shown that bacterial action is an important cause and that certain salts especially such as are obtained from sea water contain impurities that may include such bacteria. Also exact data is needed as to the rates of penetration of different kinds of salt at different temperatures, the strength of brine required for fish of different sizes and at different temperatures, the length of time fish should remain in brine, etc.

There is also need for investigation into methods of smoking fish. Neither in this country nor in any other has there been the improvement in methods, keeping in view the importance and extent of this industry, that is observed in practically all other lines of industry. There is a remarkable absence of data as to the temperatures that should obtain. Also mechanical appliances to reduce the handling of fish during smoking, etc., to a minimum, and thus lower costs of production, have not yet been introduced to any marked extent. This is obviously a matter for the consideration of a mechanical engineer rather than of a chemical expert.

Some investigations into the smoking of fish were conducted by the Biological Board some years ago, but these were not followed to a conclusion.

UTILIZATION OF FISH OFFAL

The conversion of fish offal into commercial products—meal for feeding animals, fish scrap for fertilizer and oils of different grades—has long since passed beyond the experimental state. Where large quantities of offal can be obtained at given centres cheaply, a successful commercial business in converting it into such products is perfectly feasible, and is now being engaged in quite extensively in different places in Canada.

We have, however, an enormous quantity of offal being produced along our shores which is going to waste on account of no sufficiently economical method of using it being known.

Arrangements were made early in the year whereby these matters were taken up by the Biological Board in conjunction with the Research Council, which latter appropriated seven thousand dollars for fish curing investigations. Good progress has been made and two interesting reports are now about ready for publication.

REORGANIZED SERVICE

The reorganization of the outside service along the lines explained in last year's report has been well advanced. It has been completed in our Eastern Fisheries Division, which comprises the Maritime Provinces, and it is nearing completion in the Prairie Division. It had previously been effected in British Columbia.

The service has already been placed on a much more effective and efficient basis than the previous one. Underpaid part-time officers have been replaced by an intelligent group of young active men, who are devoting their whole time and thought to their duties. This is not only resulting in a determination on the part of each officer to have his district as nearly as possible above reproach from the standpoint of observance of the fishery laws, as these young men are already becoming enthusiastic about the possibilities of the fishing industry, as well as in the natural history of the various fishes. There seems every reason for confidence that in a few years these officers will not only be law enforcers, but they will be able to be generally helpful to those engaging

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in the industry. To fit them to be such, a kind of summer school has been started. In September last all the officers in the Eastern Division were gathered at Truro, N.S., when they received a preliminary course of instructions. The Assistant Deputy Minister of Fisheries and the chief inspector for the division dealt with administrative topics. The Commissioner of Fisheries and Doctor A. G. Huntsman, of the Biological Board, gave a course of instructions in connection with fish life, and Mr. Robert Gray, Inspector of Fish Curing and Packing, dealt with the question of proper barrelmaking and packing pickled fish. These instructions occupied one week.

It is not intended to urge that a great deal of direct teaching could be done in that time; but the important point is that a start in what is a new movement has been made. The time was long enough to enable the officers to get the vision of what usefulness their positions can be made, if they do their full part in fitting themselves to properly carry through the possibilities involved.

It is intended to make this course of instructions an annual matter. To carry it out to the best advantage, it may be found desirable to call the officers together in units at suitable centres rather than as a whole. The greatest difficulty is to find a time when the officers can be spared from their districts for a considerable period and when those competent to give the needed instructions are able to arrange to do so.

CHANGE OF POLICY IN BRITISH COLUMBIA

The policy of protecting the salmon fisheries of British Columbia by means of limiting the number of persons that might engage in the fisheries and the number of canneries that might operate, together with usual regulations, which method of administration had been effective at least since 1908, was changed at the end of last year to an "open-door" policy. The department had felt for years past that the "open-door" policy was the proper one; but it was so strongly contended by those engaging in the canning industry that such a policy would speedily result in depletion of the fisheries that it was not previously found feasible to make the change. Obviously the difficulties of properly protecting fisheries such as the salmon fisheries, over the coastline of some seven thousand miles in extent, and most of which is more or less remote, are exceedingly great, and these are minimized if undue competition is prevented. The department, however, felt assured that even with the "open-door" policy the task of adequately protecting the different runs of salmon would not be an impossible one for it, and the experience of the past year has shown beyond dispute that it can do this. During the past season the Assistant Deputy Minister of Fisheries, accompanied by the Chief Inspector of Fisheries for the province went over the whole coast. He found the protection of the fisheries to be thoroughly in hand in every portion of the division, and that the organization was so complete that violations of the law could not go on to any important extent. It was also apparent on all hands that the change in policy was giving general satisfaction. The cannery managers without exception favoured it and the agitation amongst those desiring to engage in the industry, but who previously had been prevented from doing so, had disappeared.

The wisdom of the change is unquestionable and there seems little room for doubt that in the course of a year or two a request for reversion to the old policy would find no support amongst those engaging in the industry.

NEW DIVISION OF PUBLICITY, TRANSPORTATION AND MARKETING

The Publicity, Transportation and Marketing Division completed the first year of its organization on December 15 last. During the fifteen and a half months of its existence—up to the close of the fiscal year, March 31, 1921—this division has developed satisfactorily and in its various ramifications has proved of marked value to those commercially engaged in the fishing industry. The work of the three subdivisions is hereinafter discussed.

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Publicity.—The fact was early appreciated that our Canadian citizens and people of foreign countries required information as to the extent and importance of our fishing industry and enlightenment as to the comparative food value of fish and the economy of a diet with fish judiciously incorporated. At the production end of the industry propaganda is also required to impress upon fishermen, packers, etc., that certain standards must be maintained to satisfy consumers at home and abroad.

Since July, 1920, a Press Bulletin has been published monthly and distributed to newspapers throughout the country for the purpose of keeping Canadians advised regarding conditions, etc., in the industry. In addition, special illustrated articles have been supplied to different publications. Upon the occasion of National Fish Day the division exerted special energy to keep the newspapers posted and a series of special articles were sent out, together with appeals over your signature.

For some time there has been a want of literature in the form of pamphlets for the information of the layman and arrangements have been made for the publication of a series of these. Already two have been received from the printer—"Canada's Fishing Industry" and "Fish and Chip Shops"—and they are being distributed to advantage.

During the year competitions were in progress among school pupils throughout the Dominion and also among students in household economy. The prize winners in these competitions have not yet been announced.

Educational propaganda among the fishermen included a campaign to induce them to desist from using a fork in handling fish. A large display card pointing out by illustration and otherwise the evil results of such a practice was posted conspicuously at points where fishermen operate.

During the summer of 1920 photographers were engaged to take moving pictures and still photographs of various phases of the fishing industry in the maritime provinces. As a result of their work about 190 excellent still pictures and approximately 5,000 feet of film have been added to the department's collection. The moving pictures are already in circulation throughout the Dominion and later will be sent to foreign countries. Many of the still photographs are being put on lantern slides and will be circulated broadcast with appropriate lectures.

The retail trade has been urged to give more attention to advertising. Repeated efforts have been made to impress upon them the vital part which consistent advertising plays in the system of business.

Transportation.—Improved transportation is one of the vital necessities of the industry in Canada. During the past year many individual complaints have been received about inefficient freight and express service and discriminate rates. These complaints have come from the Pacific coast, the Atlantic coast and the district surrounding the Great Lakes. In the majority of cases satisfactory adjustments have been made and some cases are still pending.

In addition, efforts were made to improve the fast freight service from the Atlantic coast to Montreal and Toronto. The prevailing express rates and unsatisfactory service in many instances, have converted many to the idea that the satisfactory provisioning of these markets must depend upon regular fast freight service. As a result of a recent conference with Canadian National Railway and Grand Trunk officials, assurance has been received that the Canadian National Railway fast freight from Halifax and Mulgrave will adhere to schedule—that is, sixty-four hours and fifteen minutes from Halifax and approximately seventy-two hours from Mulgrave. Grand Trunk officials have furthermore given assurance that shipments for Toronto will be promptly picked up and made available for delivery in Toronto within thirty-six hours after leaving Montreal.

Marketing.—Concerning the marketing of fish in Canada there are many matters to be considered. The per capita consumption is not more than twenty pounds per

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annum, which is exceedingly low considering Canada's position in the fish-producing world. It is doubtful if any fish-producing country of importance has a smaller per capita consumption. It is quite obvious, however, that people will not buy fish in large quantities at high prices. While the amounts paid the fishermen have declined in recent months to almost a pre-war level, there has not been a corresponding drop in the retail prices. The reason for this, apparently, is the increased cost of transportation, labour and general operations which have shown little or no inclination toward lower levels. It appears that there is room for improvement in the matter of retail prices, but the most effective way of bringing this about is to stimulate trade and to encourage consumers to vary their fish diet in order that a greater percentage of the fisherman's catch may be utilized.

Foreign trade.—During 1920 a comprehensive survey was made of the markets of the world in regard to fish requirements and the possibility of Canadian packers and exporters successfully meeting competition.

Canadian exporters have been advised from time to time by circular letter as to the possibility of extending trade. Recently such circulars have covered the Argentine Republic, Brazil, West Indies, Australia, India, and China. The fact that practical use has been made of the information thus furnished is proved by letters which have been received from exporters. There has also been furnished to interested parties the names of fish importers in foreign countries, as well as other information which will tend toward the development of foreign trade.

SCOUTING FOR MACKEREL

Arrangements were made last spring with the Department of the Naval Service to have the Fisheries Protection cruisers, detailed to follow the movements of the United States mackerel purse-seiners, endeavour to keep just in advance of the schools of mackerel and at least daily to send wireless reports to shore giving the locations of the schools of mackerel when observed, their apparent volume and the direction in which they were moving. There was a double object in this arrangement. First it was felt that a good purpose would be served by keeping the fishermen all along the coast who were interested in the mackerel fishery advised as fully as possible as to the movement and volume of the schools of fish, and in the second place information would be gained which would be of value to those studying the natural history of the mackerel.

The daily information sent by wireless from the cruisers was repeated by telegram to all points along the Atlantic coast to the fishermen who would be interested. The cost of these land telegrams was the only extra expense that was involved in the arrangement.

Cruising began off Cape Sable on the 8th of May, and the first school of mackerel was observed on the eleventh of that month forty miles east of Seal island. This school was apparently approaching from the south and was working its way north and northeast. It was then on the west edge of Brown's bank. On the 16th of May a large body of mackerel was observed thirty miles east of Cape Sable. This school apparently followed along the southern edge of Brown's bank, a portion of it moving up the deep water channel on the western edge of the bank while the remainder followed the deep water on the eastern edge of that bank.

On the 17th of May another large body of fish was observed moving slowly northward. It was coming from the south and was between Brown's bank and LeHave bank. It converged with the school previously mentioned. The fish were next sighted on the 20th of May west of Roseway bank, where the school divided, a portion going north of Roseway bank and the main body going east between Roseway and LeHave banks.

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The cruising was continued until the fish had passed the southeastern portion of Nova Scotia.

It is hoped that it will be found feasible to continue these observations in coming years so that the fullest information possible may be available as to the movements of the mackerel.

JURISDICTION OVER THE FISHERIES

The question of extending the jurisdiction of the Federal Government over the fisheries in all parts of Canada has finally been settled. This was done by the decision of the Judicial Committee of the Privy Council in the Fisheries Reference that was agreed to with the province of Quebec in 1915. As will later be shown this reference was considered by the Court of King's Bench in 1917, but owing to the conditions brought about by the war, it was not found possible to have it argued before the Judicial Committee until this year. The decision of the committee was given on November 30, 1920.

The decision finds in substance that there is a public right of fishery, over which the Federal authorities have exclusive jurisdiction, not only in the navigable tidal waters but in the non-tidal portions of the streams that are navigable as well, thus including valuable salmon and other fisheries.

The history of this question is concisely as follows:—

At the time of Confederation it was understood that by the provisions of the British North America Act, the complete jurisdiction of the fisheries in the different provinces was transferred to the Federal Government. A few years afterwards question arose as to whether this was the case. In 1882 a decision of the Supreme Court of Canada was obtained in the case known as "Queen vs. Robertson," which determined that the ownership of the fisheries in the non-tidal waters still remained vested in the provinces or in the riparian owners. This did not apply to what are now the Prairie Provinces and the territories north thereof, as the Crown Lands therein were owned by the Federal Government. Following this decision the provinces continued to press a claim to greater jurisdiction, and a reference in the premises was finally submitted to the Privy Council, the decision of which was given in 1898. This decision was in substance, except in those waters which at the Union passed to the Dominion under the third schedule of the British North America Act, 1867, that whatever proprietary rights in the fisheries were vested in the provinces at the time of Confederation remained their property subsequent thereto; but the exclusive power to regulate the fisheries, wherever they might be situated, is vested in the Federal Government. Immediately following this decision the different sea-washed provinces claimed jurisdiction over the tidal fisheries, not only in the rivers and estuaries, but in the bays and territorial waters along the seacoast as well. The Federal Government, on the other hand, maintained that there is a public right of fishery in tidal waters, and that, as such, it came within the exclusive purview of the Federal Government.

For years negotiations went on with the different provinces to settle the matter amicably; but this was not found to be possible, and finally in 1913 a reference to the courts was decided upon with British Columbia, in which the other provinces interested became intervenants. The decision in that case maintained the contention of the Federal authorities.

This settled the question in all sea-washed provinces, with the exception of Quebec, which contended that as the decision was largely based on Magna Charta, and that as Magna Charta did not apply to the province of Quebec, the decision did not affect the situation in that province.

In order to settle the matter speedily, it was finally agreed that a reference should be submitted to the Court of King's Bench in Quebec, under authority of a provincial

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statute which was obtained for that purpose. The decision in that court was adverse to the Federal contention, but as above explained this decision was reversed by that of the Judicial Committee.

The Federal fishery regulations have been amended to place them in line with the law, as laid down by the Privy Council decision, so that during the approaching fishing season, the fisheries in the navigable tidal waters, as well as in the non-tidal portions of the streams in Quebec that are navigable and accessible by way of navigation from the sea, will be administered by this department, and no fishing in such waters will be allowed, excepting under license from the minister thereof.

INTERNATIONAL QUESTIONS

While the International Commission, that was appointed in 1918 to consider a settlement of outstanding questions between Canada and the United States, submitted a unanimous report to the respective Governments when they completed their work, it was not made public during the earlier stages of the negotiations following its submission. It was, however, published by both Governments concurrently on July 26 last, since which date copies of it have been available to those interested.

Fraser River Treaty.—Amongst the questions submitted to the commission for consideration was that of the rehabilitation and protection of the salmon fisheries of the Fraser River system, which include not only those of the estuary of the Fraser river and gulf of Georgia, but those of the northern portion of Puget sound and of the strait of Juan de Fuca as well. The commission recommended that a treaty be entered into between the two countries for the joint protection of this system of salmon fisheries, and to that end it submitted a draft of a proposed treaty and regulations thereunder. This draft treaty and regulations, with slight modifications not involving any change in intention of the treaty regulations, was approved by the two Governments and was signed at Washington on September 2, 1919. On the following day it was submitted by the President of the United States to the Senate thereof for ratification but when it came up for consideration in the Senate, objection arose to the wording of the last sentence of the second article, on the ground that under the wording thereof a person who was tried in one country for a violation of the regulations and was acquitted might be tried for the same offence, if he visited the other country, as he would not have been "punished for such offence" in the other country. Consequently on the 15th of January, the President requested the Senate to have the treaty returned to him for further consideration. This was done and on the 25th of May, 1920, an amended treaty was signed at Washington, which treaty was submitted by the President of the United States Senate for ratification on the 29th of that month, but action on it has not yet been taken by the Senate. Meantime effective measures for the building up of these fisheries are being delayed. This is exceedingly unfortunate. The existing position is aptly and concisely put in the following extract from the report of the Commission:—

The fact that these fish pass through the waters of the two countries makes it impossible to properly protect them by independent action. The fishermen of either side are inclined to operate to the limit when the fish are in their waters and place the responsibility for untoward results on those of the other country.

How the fishery has declined, will be realized from the following statement of the packs of sockeye salmon for a series of years:—

YEAR.	FRASER RIVER PUGET SOUND TOTAL.		
	No. Cases.	No. Cases.	No. Cases.
1902..	293,477	372,301	665,778
1903..	204,809	167,211	372,020
1904..	72,688	109,264	181,952
1905..	837,489	825,453	1,662,942
1906..	183,007	178,748	361,755
1907..	59,815	93,122	152,937
1908..	63,126	170,951	234,077
1909..	542,248	1,097,904	1,640,152
1910..	133,045	248,014	381,059
1911..	58,487	127,761	186,248
1912..	108,784	184,680	293,464
1913..	684,596	1,673,099	2,357,695
1914..	185,483	335,230	520,713
1915..	89,040	64,584	153,624
1916..	27,394	84,637	112,031
1917..	123,614	411,538	535,152
*1918..	16,849	50,723	67,572
*1919..	29,628	64,346	93,974
*1920..	44,598	62,654	107,252

*Added.

Two facts are outstanding:—

1. The yearly possibilities of the Fraser river must be measured by the conditions of the "big years." All that is needed to produce the run of a "big year" any season is to have the spawning beds of the whole system seeded as plentifully in the "big years" of the past. The river is as free from pollution or artificial obstruction as it ever was, and all the conditions for successful spawning are as favourable as in early times. The only deficiency is in the spawning fish.

2. Unless drastic action is taken, internationally, to save the situation, the fishery will become commercially exhausted in a few years. The figures for 1918 clearly evidence this.

It would be an international calamity, involving almost criminal neglect, on the part of both countries if the latter condition were allowed to obtain. On the basis of the present prices, the sockeye progeny of this river should be producing, annually, a food worth over \$30,000,000, this figure being based on the actual pack of the last "big year," 1913. As it is, the average value for the four years ending 1918 is about three million dollars.

Canada has left nothing undone that she could do to remedy this unfortunate condition.

Port Privileges Treaty.—No substantial progress has been made since the last annual report in the negotiations for a final settlement of the questions affecting privileges in the ports of either country to the fishing vessels of the other. Meantime the temporary arrangement for reciprocal privileges, which was made shortly after the Commission began its work, and at its instance, is being continued in both countries.

Pelagic Seating Treaty.—The good effects of this treaty are becoming increasingly evident as the years go by. The condition of constantly diminishing herds, which at the time the treaty was entered into had reached dangerously near the point of commercial exhaustion, has been replaced by one of ever increasing herds.

The herds in which Canada is interested under the treaty are those resorting to the Pribilof islands, Behring sea, which are part of Alaska, the Commander islands, also in Behring sea, but which belong to Russia, and Robben island in the North Pacific ocean, which since the Russo-Japanese war has belonged to Japan. By far the largest herds are those resorting to the Pribilof islands.

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The following statement shows the number of seals taken on the different rookeries and the revenue derived therefrom by Canada since the treaty became effective in 1912:—

Country.	Year.	Total No. of Seals Taken.	Canada's Share.	No. Sold.	Value of Canada's Share.	Total.	Net Total.
					\$ cts.	\$ cts.	\$ cts.
<i>United States—</i>							
Advances with interest provided for by treaty.....	1912	(a) 2,427	1,000	2,427	34,672 13	258,157 36	258,157 36
	1917	1,943	1,000	1,943	55,900 00		
	1918	34,890	5,234				
	1919	27,821	4,173	(b) 13,332	137,710 41		
	1920	(c) 26,648	3,997	14,840	215,622 89	443,905 43	185,748 07
							443,905 43
Exchange.....							24,560 59
							468,466 02
Skins still unsold (Jan. 31, 1921).....		61,187	9,178				
<i>Russia</i>	1917	806	121	121	3,051 40	3,051 40	3,051 40
	1918	none.					
	1919	636	96	Not yet sold			
	1920	no report.					
<i>Japan</i>	1912	139	14	123			
	1913	547	55	sold in 1917.	2,620 36		
	1914	537	54				
	1915	571	58	sold in 1918.	962 31		
	1916	none.					
	1917	none.					
	1918	550	55	Not yet sold			
	1919	555	56	"			
	1920	555	56	"		3,582 67	3,582 67
Cash received to date, Jan. 31, 1921.....							475,100 09

Unsold Skins—

From United States.....	9,178
From Russia.....	96
From Japan.....	167

Total..... 9,441

(a) 3,764 were shown in last year's report; but 1,337 of these were taken in 1911.

(b) This is the number taken up to Nov. 30th, 1920. It is possible that it may be increased slightly by skins that may have been taken in December, and which have not yet been reported.

(c) The total number sold in that year was 15,275; but 1,943 of these were taken in 1917, but as Canada, in accordance with the terms of the Treaty was paid on the basis of 1,000 skins as her share that year, these are not included in the number shown as sold.

The prices for dressed and dyed seal skins reached their high water mark at the sales held in St. Louis, Mo., in February, 1920. At these sales 9,100 skins were sold, which brought an average net price of \$121.53. At the sales in May, 1920, 5,740 skins were sold. They brought an average net price of \$57.84, or a drop of 52 per cent.

It seems quite probable that there will be a further serious decline in prices so that the financial returns in the future will doubtless be proportionately less than they have been to date.

International Arrangement for Deep Sea Fisheries Investigations.—The question of international co-operation in deep sea fisheries investigations was under consideration before the war, but had to be deferred on account of it.

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In Europe most of the maritime countries about twenty years ago arranged for co-operation in such work and to that end they formed an association known as the International Council for the Exploration of the Sea. Permanent headquarters for this council are maintained at Copenhagen.

While Canada was urged to become a member of this council, and so contribute to the cost of its maintenance, it was felt that our problems could best be solved by direct investigation on this side of the ocean; and it was feared that there was not much likelihood that such investigation here could be expected at least for many years by the council.

As such work on this side is of common interest on the Atlantic coast to Newfoundland, the United States and Canada, and on the Pacific coast to the United States and Canada, it is obviously desirable that there should be co-operation between these three Governments in carrying it out. To this end an informal conference of fisheries experts representing the Governments of the three countries was convened at Ottawa in September last, when the following resolution was unanimously adopted:—

Be it Resolved That,—It is the sense of this meeting that, on the nomination of the fishery services of the countries represented, each of the respective Governments should forthwith designate three persons to constitute an International committee on marine fishery investigations, this committee to determine what measure of International co-operation is desirable, what general investigations should be undertaken, consider definite problems that may be awaiting study, submit recommendations to their respective Governments, and co-ordinate and correlate the results of the work.

It is the expectation that the respective Governments will undertake to provide the necessary ways and means for conducting such independent and co-operative investigations as may be adjudged desirable by the International committee.

It is recommended that the International committee establish contact with the Permanent International Council for the Exploration of the Sea.

This resolution was subsequently approved by the three Governments. Under its provisions it will be possible to guard against unnecessary duplication of effort in the different countries and to arrange for complimentary work along certain lines, so as to assure the maximum of information to be obtained with a minimum of expenditure and in a minimum time, and without the necessity of maintaining any expensive separate organization.

The Canadian representatives on this committee are:—

Wm. A. Found, Assistant Deputy Minister of Fisheries.

Dr. A. G. Huntsman, of the Canadian Biological Board.

Mr. Loring C. Christie, LL.B., Legal Advisor of the Department of External Affairs.

The United States representatives are:—

Dr. H. F. Moore, Deputy Commissioner of the United States Bureau of Fisheries.

Dr. Robt. E. Coker, Chief of the Division of Scientific Inquiry, in the Bureau of Fisheries.

Dr. Henry B. Bigelow, Consulting Oceanographer of the Bureau of Fisheries.

Up to the moment the names of the representatives of the Government of Newfoundland have not been received; but with as little delay as possible thereafter a meeting of the committee will be held to arrange the work to be undertaken during the approaching fiscal year.

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INVESTIGATIONS INTO THE NATURAL HISTORY OF THE LOBSTER

Since the summer of 1914 inclusive, Dr. A. P. Knight, then of Queen's University, a member of the Marine Biological Board—he is now the chairman of that board—has spent his summers in investigating the life-history of the lobster. These investigations have been of such eminent interest and value that a summary thereof is now desirable.

Lobster rearing.—During the summer of 1914, Dr. Knight began a series of experiments to ascertain whether lobster fry could be fed and kept alive for four or five weeks after leaving the egg. Lobster hatcheries had been in yearly operations in Canada since 1891; but rearing the fry until they had become lobsterlings, that is until they were ready to sink to the bottom and adopt the life of the adult—had never been tried. This method of propagation had been in operation at Wickford, Rhode Island, from 1905 onward, and the claim was made that it was successful; hence, the demand that it should be tried out in Canada.

The method consisted in placing berried lobsters in floating boxes let down into the sea water. The boxes were ten feet long by ten feet wide by four feet deep, and had openings in the four sides, which were covered by copper wire screens. Paddles were made to revolve in each box and so cause fresh sea water to be drawn into the boxes, and the stale water forced out; thus ventilation was provided for. The fry were fed upon scrambled eggs every two hours day and night during the four weeks they were kept in confinement. They were then placed in the sea with the expectation that many more of them would grow to maturity than would be the case with newly hatched fry.

The site chosen for the repetition of the Wickford experiment in Canada was a sea pond of about five acres, which lay immediately beside the northwest end of St. Mary's bay, Digby County, N.S.

After repeated trials which extended over two summers in this location, the method was abandoned as a failure. Not a single fry had reached the third stage, though a few hundred had lived for seventeen days. The immediate cause of death was in most cases the accumulation of a large number of diatoms (microscopic plants) about the mouth parts, so that the animal was unable to eat. It is almost certain, however, that the true cause of death was the low temperature of the water. In Rhode Island waters, the temperature varied from 68° F. to 72° F.; at the west end of St. Mary's bay from 50° F. in June to a maximum of 60° F. in August.

For the next two summers the apparatus was used near Pictou on Northumberland strait. Here there was no difficulty in rearing 4 per cent of the fry until the lobsterling stage, the temperature varying around 68° F. The cost however, was out of all proportion to the number of fry that could be obtained, and hence the attempt to propagate the lobster by this method was abandoned altogether.

Lobster Mating.—While the experiments in St. Mary's bay turned out to be a failure, there grew out of them a discovery that may yet be of great importance in lobster propagation. Dr. Knight's discovery was that if mature male and female lobsters be confined in compartments during the breeding season, many more of the females will become egg bearers than is the case when they roam at large in the sea. This discovery was a matter of accident, and was rendered possible by the facilities afforded by the pound which the department had erected in the Long Beach pond for the retention of egg-bearing lobsters during the legal fishing season for liberation when such season had ended. The discovery came about in this way. Up to 1914 the prevalent opinion among lobster experts was that females which bore eggs, say in the summer of 1914, would not again produce eggs until the summer of 1916. They would cast their shells in the summer of 1915 but bear no eggs.

To test the accuracy of this opinion 47 females and 15 males were placed in a latticed pen in the pond. The pen was only twenty feet long by ten feet wide. This was about the middle of June. On August 12, the whole 62 were dipped up to see

what condition they were in. Much to the surprise of everyone, 36 per cent of the females carried eggs. The surprise was not lessened when it was discovered that by the end of September the percentage had increased to 64: that is 30 of the 47 females carried eggs. The 17 which had not extruded eggs were the smaller ones.

Careful inquiries amongst nearly all the lobster fishermen at the west end of St. Mary's bay, and on the south shore of the Bay of Fundy elicited the fact that not over one per cent of the females which were caught in lobster traps ever carried eggs.

However, the Biological Board realized that inquiries amongst fishermen and mere speculation were not going to settle the question of the percentage of berried lobsters occurring naturally in the seed. Accordingly at the request of the board, the department sent out its naturalist, Mr. Andrew Halkett, for part of each of the summers of 1916 to 1920 inclusive, with instructions to accompany lobster fishermen in their boats, and ascertain exactly what percentage of berried female lobsters were caught in traps. He visited hundreds of places along the coast of the Maritime Provinces and found that the percentage varied from zero as a minimum in some places to a maximum of 14 per cent at Pugwash, N.S. The average for the whole coast varied between four and five per cent.

Concurrently with these determinations of the percentages of berried females occurring among the lobster population of the sea, experiments were continued in St. Mary's bay, at Pictou, N.S., and at St. Andrew's, N.B., as to the results of confining male and female lobsters in latticed pens during the breeding season of 1915. In all three cases, the general results were the same—there was a marked increase of berried females, for example the percentage in the mating pens in St. Mary's bay was 25; at St. Andrew's, 36: and at Pictou, 66. In 1916 mating experiments at the same three places showed an average of 40 per cent of berried females as compared with an average of 4 per cent in the sea immediately alongside of the mating pens. At Bay View the percentage was 66.

In 1917 the St. Mary's Bay pond was selected as the place in which mating could be put to its severest test. The pond is unsuitable for the purpose. Sulphuretted hydrogen (gas) exudes from the soft slimy bottom during the whole summer and algae growths soon accumulate upon the animals. Notwithstanding these drawbacks, it turned out that out of 1,000 females placed in the pond, 40 extruded eggs. How does this compare with the percentage of egg bearers in St. Mary's bay? Fishermen's traps showed a percentage of 1.22. That is, mating in lobster pens in the sea pond showed an increase of 330 per cent over the percentage naturally occurring in St. Mary's bay.

In 1918 mating experiments were continued in what is usually considered two of the most favourable localities in Northumberland strait, viz., at Tormentine and cape Traverse. At Tormentine out of 21 females which were mated with 21 males, 12 extruded eggs, or 57 per cent. At cape Traverse 24 females were mated with 24 males, and 12 extruded eggs, or 50 per cent.

To sum up then, during the five summers that mating experiments were carried on in latticed pens, the results show a very great increase of egg bearers over the numbers found to occur naturally at sea. What is the explanation? It would appear to be this. Mating in the sea at the present time would seem to be largely a matter of accident. It is said that the male does not seek out and immediately recognize a female. He, therefore, like the male crab, "tries" every lobster he meets—male and female alike. If a female does not chance to meet a male, her eggs are extruded just the same, but being unfertilized they "go bad" and of course produce no larvae. The fewer lobsters there are and the wider range over which they are distributed, the less the chances for mating and the fewer the numbers of berried females. In fact the same law operates in the sea as on the land. As the forest becomes cut down the wild animals which inhabit it become more and more scattered, and the production of young is decreased. Notwithstanding the indirect advantage that would

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result to the lobster industry if mating were systematically carried on by fishermen in areas that are especially suitable for lobster production, it is nevertheless true that neither fishermen nor canners have shown any disposition to put mating into practice. This is not to be wondered at. Hitherto nature has furnished immense numbers of animals without labour and without cost and as long as the natural supply keeps up men will catch all they can, until the numbers dwindle and fishing becomes unprofitable, or at any rate less profitable than fishing for other species. Should that point ever be reached in the lobster fishery, then the fishermen will no doubt turn to the mating of lobsters and co-operate with the Department in other practical forms of restoration and conservation. But that time has not yet come and with the close protection the fishery is now receiving, which has been made possible by the reorganized service, and with the evident good results in the way of the preservation of the berried lobster by the fishermen themselves, following the educational campaign carried on amongst the fishermen and canners, there is excellent reason to believe that such time will never come. Not only has the decline in the number of lobsters been permanently arrested, but a building-up process has been begun.

Educational Campaign.—The beneficial results that followed the educational campaign that was carried on amongst the lobster canners and fishermen in 1918 and again in 1919 were explained in the last annual report. These campaigns were followed during the winter of 1920 by a series of illustrated addresses by the department's naturalist, Mr. Andrew Halkett, in western Nova Scotia. Much interest was manifested by the fishermen in these addresses and helpful discussions followed them. Similar work is being carried on by him in Prince Edward Island during the present winter.

It is hoped that by such methods not only will the fisherman's knowledge of the natural history of the lobster be much enlarged but that his active sympathy and co-operation will be secured in affording the fishery the protection it must have if it is to be built up to a maximum of productivity.

Observations on the Scallop at Mahone Bay, N.S., and Digby Basin, N.S.—Mr. Andrew Halkett, naturalist of the department, continued his observations on the scallop at Mahone bay. These were similar to those made in the preceding year and published in the report for that year.

The observations at Digby basin led to the conclusion that important scallop beds exist therein.

FISHWAYS

For many years one of the most difficult problems with which the department has had to deal in the protection of our anadromous fishes, and particularly salmon, shad and gaspereau, in our Atlantic rivers, has been the damming of such rivers for power purposes. This problem is beginning to be experienced to some extent in British Columbia, and it will no doubt grow there. With the increasing demand for water power the problem is becoming greater, as larger and higher dams are being built. Not only are these higher dams more difficult to equip with fishways that ascending fish will readily take, but as soon as the time of high water is over they frequently require the full flow of the stream for their power wheels, thus leaving the fishway and sometimes a stretch of the river bed below it so nearly high and dry as to be useless for the purpose intended.

The owners of dams built across important streams have for years been required to equip them with fishways. While these fishways seemed to afford a ready and easy means of ascent for fish, as a general thing it was found that fish were using them to a very limited extent. Hence the fish were being largely prevented from reaching their natural spawning grounds.

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During the past three years the department has been having its fisheries engineer devote special attention to the fishway problem. The results are highly promising.

A report by the engineer dealing fully with the work done in this connection during the year is appended hereto.

INSPECTION OF FISH

During the season of 1920 the inspection of pickled fish and barrels was carried on as in the preceding year under authority of the Act of 1914. There were employed one inspector in Nova Scotia, one in New Brunswick, and one during the winter herring season in British Columbia. Owing to the unsatisfactory condition of the markets for all cured fish, and the high price of barrels and salt, the pack of pickled fish in 1920 was much below normal. Inspection was, of course, optional, and while the number of packers who took advantage of it in the past season was greater than in the preceding one, the number of barrels submitted for inspection was slightly less. The following table shows the number of packers who presented their fish for inspection, and the number of barrels inspected annually since the inspection was made available:—

Year.	Packers	Barrels inspected
1915..	16	1,320
1916..	73	7,213
1917..	80	8,977
1918..	110	20,664
1919..	82	8,730
1920..	105	8,082

While our educative and persuasive efforts under an optional inspection Act have on the whole accomplished a good deal in the way of inducing the trade to use better barrels, and to pack better fish, experience has made it clear that the means provided by such an Act were not suited for securing speedy general improvement. A system of inspection which requires inspecting officers to plead with packers to submit their product for inspection is very far from being a satisfactory one, because it makes it difficult for them to condemn the inspected product if not quite in accordance with the requirements of the Act. It was realized that so long as inspecting officers are without authority to insist on at least some of the essential points in the construction of packages, and the packing and marking of fish being complied with, the bulk of the Canadian output would continue to be marketed as poor grade stuff in inferior packages, and result in the nullification of the efforts of those packers who are endeavouring to build up a name for Canadian goods by producing a higher grade article. The department was driven to the conclusion, therefore, that the Act of 1914 required amending in order to give power to the inspecting officers to compel all coopers and packers to comply with its provisions. In this the department had the strong backing of the Canadian Fisheries Association, the Halifax Board of Trade, the Vancouver Board of Trade, the Commissioner of Fisheries for British Columbia, the now defunct Canada Food Board, and of many individual fishermen, coopers, packers and dealers.

Under the Act of 1914, when a packer desired to have his fish inspected, he notified an inspector, who visited his curing place, carried out the inspection there, and put an official stamp on such of the fish as may have been worthy of it. The experience of the past few years led to the belief, however, that that system of inspecting and branding could not be satisfactorily carried out under a compulsory standard of packing except by the employment of a very large and expensive staff of inspectors, owing to the enormous number of individual packers scattered over thousands of miles of coast line, and the greater quantity of fish that would, therefore, have to be dealt with. Consequently, the question as to what system would be

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most acceptable, effective and economical in applying the principal of compulsion was duly discussed with those directly engaged in the business, and the conclusion was reached that a system somewhat similar to that under which the inspection of fruit is carried on should be applied to the inspection of fish.

During the last session of Parliament, therefore, the Fish Inspection Act of 1914 was amended by the Fish Inspection Act of 1920, which provides authority for carrying on the inspection of fish and packages along the lines proposed. The amended Act became operative on the Pacific coast on November 1, 1920, and on the Atlantic coast on April 1, 1921. Its main purpose is to require that all pickled fish be fit for human food; that such fish be packed in water-tight barrels of a standard size; that the barrels contain the proper weight of fish, and that the fish be as represented by the marks placed upon the barrels by the packer. Fish packed by fishermen or other persons for their own use, and not intended to be sold, are exempted from the provisions of the Act.

The following is a summary of the requirements of the Act and of the regulations made thereunder:—

1. All barrels or other containers in which pickled herring, alewives, mackerel and salmon, except mild-cured salmon, are to be packed and marketed must be made in accordance with the standards defined in the new regulations, and marked by the maker with his name and address. The length and thickness of staves are to be as defined in the regulations made under the Act of 1914. In other respects the standards of requirements for barrels, with one or two minor exceptions, are similar to those defined in the old regulations.

2. All herring, alewives, mackerel and salmon, except mild-cured salmon, packed in salt and pickle in water-tight barrels or other containers, must be cured and packed in accordance with the requirements of the new regulations.

3. On the end of each barrel or container filled with either of the above-named kinds of pickled fish must be stencilled by the packer or the first dealer who repacks or reconditions the fish his name and address, the grade and the weight of the fish in the barrel or container. Pickled fish shipped by a packer to be repacked or reconditioned by the first dealer or buyer in Canada, if ungraded, may be marked "ungraded" but the containers and fish must in other respects be in accordance with the requirements.

4. Competent inspectors will visit coopers' shops and curing places for the purpose of giving instruction and advice, but the new Act does not require them to visit such for the purpose of stamping or branding the output of coopers and packers. There will be no official brand.

5. Coopers must see to it that their barrels are properly made and that their name and address is shown thereon. Packers or repackers must likewise make sure that their fish are properly packed and that the marks they place on the containers truly and correctly represent the contents.

6. At any time or place which may be found suitable or convenient, after the barrels or containers have been packed with fish, marked and made ready for market, an inspector may examine samples of the containers and fish in order to assure himself that the containers are in accordance with the standard, and that the fish are as the marks on the containers represent them to be.

7. When an inspector finds barrels or other containers, in which pickled fish are packed, not up to the standard, he will mark such barrels or containers with the words "Container below standard," and when he finds that such barrels or containers do not show the name and address of the maker, he will hold them until such name and address is ascertained. For such violations the barrel maker becomes liable to a fine not exceeding fifty dollars for a first offence.

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8. Further, when an inspector finds that the fish are not of the grade or not of the weight shown by the marks, or not of good quality, he will mark the containers with the words "Fish below grade," "Fish below weight," or "Fish below quality," as the case may be, and the packer or repacker of such fish becomes liable to a fine not exceeding fifty dollars for a first offence.

9. When an inspector finds that the barrels or other containers have no marks to show the grade and weight of fish, or if the name and address of the packer or repacker is not shown, he will seize and hold such fish until such name and address is ascertained, and the packer or repacker, in such a case, becomes liable to a fine not exceeding fifty dollars for a first offence.

10. An inspector may detain, for the time necessary, to carry out an inspection, any shipment of pickled fish if he has reasonable grounds for believing that the marks on the containers constitute a violation of the Act. In such a case he will immediately notify the packer or owner.

11. Pickled fish imported into Canada for sale must be packed in barrels similar in character and equal in quality to those required under this Act. The marks on the barrels must show the kind, grade and weight of fish and the country of origin. The name of the country of origin only is required to be shown on barrels of pickled fish imported for exportation.

12. In the event of a dispute between an inspector and the packer or owner as to quality, weight or condition of the fish or the size or condition of the containers, the packer or owner may appeal to the Minister who may order a reinspection.

In order that all fishermen, coopers and packers, who are directly concerned, might be fully informed of the Act's requirements, the forgoing summary was printed and distributed to them immediately after the passing of the Act. Complete copies of the Act and the regulations made thereunder were likewise distributed as soon as such were available.

CANNERY INSPECTION

Under authority of the Meat and Canned Foods Act the inspection of all fish and shell-fish canneries and of the packing operations therein, was carried on during the packing season of 1920, as in the past, by the department's outside staff of fishery officers.

This inspection has a twofold object: (a) the extension of trade, by improving the quality of the product; (b) the protection of the public, by preventing the packing of unsound fish and insisting that all cans of fish be correctly labelled.

On the Atlantic coast there were in operation 588 establishments canning lobsters, 2 canning sardines, 5 canning clams and scallops, and 22 canning other fish, such as mackerel, cod, haddock and herring; while on the Pacific coast there were 66 establishments canning salmon, 6 canning herring, pilchards, etc., and 1 canning crabs. There were in all 1,622 formal inspections made and reported on during the season, in addition to many more incidental visits of inspection.

A number of defects, such as unsatisfactory ventilation and drainage, defective coolers and utensils, were noted and corrected. In several cases licenses were withheld until the canners were made to comply with the standard of requirements. One cannery which was found to be without proper sanitary equipment for the use of the employees was made to provide such under threat of closure.

The Act, as amended November, 1919, provides definite weights of dried lobster meat for the various sizes of cans thereof, and was enforced for the first time during the past season. At the beginning of the lobster canning season in western Nova Scotia and Prince Edward Island, cans which did not contain the prescribed weight of lobster meat were found in some of the canneries. One canner was prosecuted, but the evidence showed that while some cans were under weight others were full

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weight and some even over weight. In some instances it was found on a reinspection, after some weeks, that the meat had absorbed so much of the liquid as to bring it up to the full weight. As there did not appear to be any intention on the part of this packer to defraud, the case was dismissed.

The whole matter of dealing with the packing of light-weight cans of lobster was found to be a difficult one to handle, owing to certain loopholes in the Act, which came to light during its enforcement. The action taken, however, and the activities of the fishery officers in warning lobster packers against packing light weights, have done much good, inasmuch as packers, realizing that the law was being enforced in earnest, immediately began to exercise the greatest care in seeing that the proper amount of meat was put into each can, and it seems highly probable that there will be little trouble in this respect during the season of 1921.

A great deal of trouble was experienced in the course of the past year in enforcing the labelling requirements for the various kinds of canned fish. Some which were found to be wrongly labelled were held until relabelled; a quantity of salmon found on sale in British Columbia under misleading marks were seized and confiscated; several lots of canned fish, imported for sale in Canada, found to be either wrongly labelled or without labels of any kind, were refused entry until the labelling requirements had been complied with.

It is felt, however, that most of the troubles which were met with in the past year will not recur in the coming year, as packers, taken as a whole, have been found really anxious to comply with the provisions of the Act.

FISHERIES STATISTICS

Under an arrangement between this department and the Dominion Bureau of Statistics, the latter now compiles and publishes the annual statistics relating to the fisheries, as Part III of its Census of Industry. The information is secured partly from manufacturing establishments, on individual schedules designed to fit in with the bureau's general scheme of securing industrial statistics, and partly by the officers of this department, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department, and afterwards handed over to the Bureau of Statistics for publication. A general review only, made up from information obtained by the department from time to time, is given in this report.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea-fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department and made public through the press, monthly.

Once every three months the monthly information is compiled to show the total landings of the various kinds of fish for the quarter by provinces and for the whole of Canada. This is printed and published in the form of a Quarterly Bulletin and distributed to the trade and all directly concerned. The Quarterly also contains summaries, made up from official monthly reports of the landings of fish in the United States, England, Scotland, Ireland and of certain kinds in Norway.

FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

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For the year 1920, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$7.60 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$6.10 each.

There were 9,671 bounty claims received and 9,664 paid. In the preceding year, 18,068 claims were received and 13,061 paid.

The total amount paid was \$152,519.30, allocated as follows:—

To 612 vessels and their crews, \$53,577.80.

To 9,052 boats and their crews, \$98,941.50.

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Provinces and Counties.	Number of Vessels.	Tonnage.	Average Tonnage.	Number of Men.	Amount Paid.		Number of Boats.	Number of Men.	Amount Paid.		Total Bounty Paid to Vessels and Boats, 1920.
					\$	cts.			\$	cts.	
<i>Nova Scotia—</i>											
Annapolis.....	1	60	60	20	212 00		115	190	1,268 90		1,480 90
Antigonish.....	16	212	13	64	691 00		121	182	1,231 20		1,231 20
Cape Breton.....							222	385	2,556 50		3,247 50
Cumberland.....	4	118	30	29	338 40		2	3	20 30		20 30
Digby.....	56	877	16	248	2,736 60		319	534	3,574 40		3,912 40
Guyssboro.....	59	891	15	249	2,764 20		619	980	6,586 80		9,323 40
Halifax.....	1	14	14	2	29 20		1,027	1,392	9,540 60		12,304 80
Hants.....	22	342	16	106	1,136 80		288	569	3,759 90		4,806 70
Inverness.....	1	11	11	3	33 80		43	61	415 10		448 90
Kings.....	144	9,295	65	2,422	27,627 60		536	651	4,514 00		32,141 60
Lunenburg.....							39	51	344 10		344 10
Pictou.....	12	231	19	62	697 40		158	249	1,683 00		2,380 40
Queens.....	31	561	18	156	1,726 20		355	608	4,059 80		5,786 00
Richmond.....	25	660	26	185	2,045 60		534	957	6,368 70		8,414 30
Shelburne.....	12	181	15	52	576 40		236	351	2,373 10		2,949 50
Victoria.....	21	1,151	55	348	3,775 40		88	180	1,186 00		4,961 40
Yarmouth.....											
Total.....	405	14,604	30	3,946	44,390 60		4,702	7,343	49,482 40		93,873 00
<i>New Brunswick—</i>											
Charlotte.....	6	90	15	23	253 60		303	499	3,344 90		3,598 50
Gloucester.....	177	2,673	15	721	8,064 60		66	135	889 50		8,954 10
Kent.....	7	70	10	18	206 80		57	119	782 90		989 70
Northumberland.....	1	21	21	4	51 40		1	3	19 30		70 70
Restigouche.....	1	11	11	1	18 60		1	1	7 10		25 70
St. John.....							12	19	127 90		127 90
Westmorland.....							1	1	7 10		7 10
Total.....	192	2,865	15	767	8,595 00		441	777	5,178 70		13,773 70
<i>Prince Edward Island—</i>											
Kings.....	4	67	17	13	165 80		312	433	2,945 30		3,111 10
Prince.....	5	77	15	20	229 00		275	498	3,261 80		3,490 80
Queens.....	3	36	12	7	89 20		104	216	1,419 60		1,508 80
Total.....	12	180	15	40	484 00		691	1,147	7,626 70		8,110 70
<i>Quebec—</i>											
Bonaventure.....	1	11	11	2	26 20		216	374	2,479 50		2,505 70
Gaspé.....	1	10	10	4	39 20		2,182	3,982	26,250 20		26,289 40
Rimouski.....							50	74	501 40		501 40
Saguenay.....	1	20	20	3	42 80		770	1,121	7,422 60		7,465 40
Total.....	3	41	14	9	108 20		3,218	5,551	36,653 70		36,761 90
Grand Totals.....	612	17,690	29	4,762	53,577 80		9,052	14,818	98,941 50		152,519 30

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FISH CULTURE

The fish cultural operations for the calendar year 1920 were restricted to the fresh water and anadromous species, and also were confined almost entirely to the more important commercial foodfishes such as, Atlantic salmon in the east, whitefish, cisco, salmon trout and pickerel in the interior, and the various varieties of salmon in the west.

The most of the commercial species were distributed as fry after the food sac was absorbed, on the natural spawning grounds, and largely where the eggs were collected. The sporting varieties such as, speckled trout in the east and cutthroat and rainbow trout in the west were hatched in limited numbers, and after adequate return was made to the areas where the eggs were collected were practically all deposited in public waters. A small percentage was allotted to privately controlled or leased areas, on payment of nominal prices and distribution expenses.

The feeding of salmon has been given greater attention during the past summer than formerly and the distribution of fingerlings was considerably increased. The use of natural ponds for this purpose was given particular consideration and the neighbourhood of practically all the salmon hatcheries was carefully inspected with the object of locating suitable places for such ponds on a large scale. Arrangements are sufficiently advanced to enable a considerable portion of the coming season's hatch of salmon to be retained and fed through their first summer, and unless something unforeseen occurs accommodation will be available at several hatcheries by next autumn to hold a large number of fry into their second summer, or to the age at which the majority migrate to sea, under natural conditions.

The conditions met with during the collection of eggs were most unfavourable in some areas, with a consequent decrease in the number of eggs obtained. The total collection of 1919 was exceeded, and a record was established in the number of whitefish eggs obtained, which was over two hundred million greater than in the previous year. Increases were also made in the collection of Atlantic salmon and cutthroat trout eggs.

The total collection of eggs of the different species was as follows:—

COLLECTION OF EGGS DURING 1920.

Atlantic salmon..	29,080,200
Ouananiche..	60,000
Cutthroat trout..	1,061,635
Steelhead salmon..	161,900
Kamloops trout..	344,000
Sockeye salmon..	85,368,450
Spring salmon..	4,491,500
Cohoe salmon..	3,866,300
Chum salmon..	5,727,000
Speckled trout..	502,950
Whitefish..	789,605,000
Salmon trout..	29,403,500
Cisco..	21,380,000
Pickerel..	231,384,800

1,202,437,235

An abundance of grilse in the Atlantic salmon rivers generally during the past autumn is a most encouraging indication of a return to normal conditions after the comparatively small runs of salmon of the past two seasons. The conditions on the spawning grounds of the British Columbia rivers during the past season were also most encouraging. All the hatcheries in the province were well filled and, in addition, the natural spawning beds were well seeded. The collection of sockeye salmon eggs alone was upwards of eighty-five million, although the climatic conditions in many districts during the egg-collecting season were very unfavourable.

A modern and fully equipped hatchery was completed on Granite creek, a tributary of Lakelse lake, which in turn flows into the Skeena river, to replace the old

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establishment on Coldwater creek, tributary to the same lake, which was put out of commission by abnormal freshets three years ago. The hatchery building is 110 feet long by 40 feet wide with an L 16 feet by 20 feet; walls 10 feet high and roof carried on ten trusses. The equipment includes one hundred and twenty hatching troughs having a total capacity of ten million eggs. A central floor drain, the full length of the hatchery, 6 feet wide and from 18 inches to 2 feet in depth, into which the water from the troughs discharges provides considerable space for fry, which will relieve the troughs during the hatching period. The other buildings include the superintendent's dwelling, which is a four-room bungalow, 25 feet 6 inches by 30 feet; living quarters for the staff, which is a two-storied seven-room building, 25 feet by 30 feet, and a boathouse with a landing stage. All the buildings are constructed with concrete foundations and the hatchery with concrete floor throughout. Both dwellings are modern, with basements, hot-air furnaces and sanitary plumbing. The construction was carried on by day labour, under the direct supervision of the Fisheries resident engineer for British Columbia.

There are now thirty-five main hatcheries, eleven subsidiary hatcheries and six salmon retaining ponds in operation, from which the total distributions of the different species in each province during the season of 1920 was as follows:—

HATCHERY OUTPUT BY PROVINCES OF EGGS, FRY AND OLDER FISH DURING 1920.

Nova Scotia—

Atlantic salmon.. . . .	6,487,750	
Rainbow trout.. . . .	105,000	
Speckled trout.. . . .	165,000	
		6,757,750

New Brunswick—

Atlantic salmon.. . . .	10,083,444	
Rainbow trout.. . . .	12,500	
Speckled trout.. . . .	328,403	
		10,424,347

Prince Edward Island—

Atlantic salmon.. . . .	860,140	
Speckled trout.. . . .	124,265	
		984,405

Quebec—

Atlantic salmon.. . . .	2,376,581	
Speckled trout.. . . .	179,633	
		2,556,214

Ontario—

Spring salmon.. . . .	433,200	
Whitefish.. . . .	205,662,500	
Salmon trout.. . . .	20,401,252	
Cisco.. . . .	40,800,000	
Pickrel.. . . .	120,400,000	
		387,696,952

Manitoba—

Whitefish.. . . .	201,111,250	
Pickrel.. . . .	25,353,600	
		226,464,850

Alberta—

Rainbow trout.. . . .	607,660	
Cutthroat trout.. . . .	432,752	
Salmon trout.. . . .	174,441	
		1,214,853

British Columbia—

Cutthroat trout.. . . .	172,075	
Steelhead salmon.. . . .	107,454	
Kamloops trout.. . . .	238,805	
Sockeye salmon.. . . .	90,175,369	
Albino spring salmon.. . . .	4	
Spring salmon.. . . .	3,951,253	
Kennerly's salmon.. . . .	1,034,000	
Cohoe salmon.. . . .	2,243,403	
Pink salmon.. . . .	4,264,050	
Chum salmon.. . . .	584,000	
Speckled trout.. . . .	6	
Whitefish.. . . .	11,517,000	114,287,419
		750,386,790

Total distribution.. . . .

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As above indicated, experiments have been carried on with different kinds of food for young fish, prepared in various ways and fed in different rotations. Experiments have also been made in hatching eggs in gravel under conditions as near those of nature as possible. This method has yielded most satisfactory results in some instances, but further experiments are necessary before the method can be adopted on a larger scale. Under certain conditions, it provides an efficient means of stocking isolated waters to which fry cannot be conveyed from existing hatcheries. The stocking of lakes, barren of fish life, but containing an abundance of natural food, has proven most efficient. Sockeye fry in some instances have attained, in from seven to ten weeks, a growth equal to the average growth attained by the Fraser river sockeye in one year.

The acclimatization of the better varieties of food and sporting fish has also been achieved. The eastern speckled trout and whitefish have been established in considerable areas in British Columbia, and encouraging returns are apparent from the distribution of spring salmon in certain tributaries of lake Ontario. The introduction of bass and other fish of predatory habits into salmon and trout areas, on account of the harm that might be done to the young of these species is discouraged.

Investigation of the spring and autumn runs and the possibility of these runs comprising two races of salmon in the Atlantic rivers has been continued. In the Miramichi and Margaree rivers, where the late run predominates and parent salmon are caught during their upward migration, after August 25, eighty per cent of the recaptures were caught before August 15 and less than twenty per cent after that date. Adjoining rivers, similar in character, are being stocked, in one case with the fry from a river in which the run is predominately early and in the other case from a river in which the late run predominates and the early run has practically ceased to exist.

The good effects of fish culture have become more and more apparent on all sides. Very few salmon ascended the rivers of Prince Edward Island previous to the establishment of the hatchery in 1906, but as a result thereof all of its rivers and larger brooks were practically teeming with salmon during the last spawning season. Salmon have not been seen in the Nashwaak river, N.B., for over fifty years, but as a result of systematic stocking it carried a heavy run last season. Notwithstanding the fact that the close season was recently abolished in the Great Lakes, the whitefish fishery is increasing steadily and the catch per net in lake Winnipeg was last year greater than it ever was. The upper waters of the Fraser river, B.C., where no hatcheries have been operated, have for several years been practically depleted of salmon, while good runs have annually occurred in the lower reaches where several hatcheries are located. There was a larger number of spawning sockeye in the Birkenhead river last year than there has been for thirteen years past. The Fraser river situation, however, cannot be successfully handled otherwise than by proper international co-operation. The run of sockeye to Anderson lake, Vancouver island, was fifty per cent greater than it was in the previous year, which was the best for ten years previously. It is estimated that not less than seventy thousand sockeye reached the spawning areas of this lake. Definite runs have been established in many areas to which sockeye did not resort before they were stocked from the hatcheries, and most satisfactory returns are apparent from several of the prairie lakes that have been stocked with whitefish. Whitefish are also returning to the southerly portion of Georgian bay, as a result of the Collingwood hatchery.

A report in detail of the fish cultural operations of the Department is being published in pamphlet form.

OYSTER CULTURE

The officer in charge of this service examined the various oyster fishing areas in the gulf of St. Lawrence and cleaned the beds which required cleaning.

The Bay du Vin area was found to be in a satisfactory condition.

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In Richibucto river the oysters transplanted two years ago were examined and found to have grown considerably.

The grounds at Caribou, N.S., where oysters from the United States and Prince Edward Island had been planted some years ago, were found to be clean and in good condition. The oysters have grown well, especially those from Prince Edward Island. But no evidence of spat or young oysters could be discovered and the officer is of the opinion that reproduction has not taken place because the water in which the oysters were transplanted is of much greater salinity than that from which they were taken.

The oysters planted in the harbour of Brule, N.S., during the spring of 1919 were found to be growing remarkably well. There was practically no mortality in this transplanted lot.

In Charlottetown harbour and surrounding waters the beds are in good condition. Here during the oyster fishing season the officer boarded the boats, inspected the catches and gave advice to fishermen with respect to culling the undersized oysters and returning them to the beds.

The areas in Richmond bay, P.E.I., which became depleted a few years ago by a disease which practically killed all the oysters, show no signs of improvement yet. The beds, both public and private, as a result of not being fished in the last two or three years are becoming overgrown with eel grass and mussels.

The beds in Casumpeque bay seem also to have fallen a prey to the disease since last year, as no live oysters were caught there except on some fresh beds in Kildare river.

BIOLOGICAL STATIONS OF CANADA.

The two Biological Stations under the direction of the Biological Board of Canada had the most successful season during 1920 in the history of biological research in Canada. In addition to the paid staff of eight persons in the station at Saint Andrews, there were nearly twenty scientists who carried on investigations. Professor A. B. Knight, Kingston, Ont., chairman of the Biological Board, conducted some difficult and lengthy experiments on the influence of temperature on newly-hatched lobsters and he devised a method of rearing them to a somewhat advanced stage. When Professor Knight left for Prince Edward Island at the end of July, Professor Prince continued the investigations and a number of young lobsters were reared through a series of the early stages and these stages were preserved so that it would be possible to prepare a very detailed report on the changes which these young lobsters undergo in their early life history. Professor L. W. Bailey, Fredericton, continued his studies of Canadian Diatoms and paid special attention to a valuable collection from Quill lakes, Sask.; Professor A. W. Willy, McGill University, examined a large collection of Plankton material from the Miramichi river. He drew up descriptions of a series of Copeoda, which will be of great importance in connection with the feeding habits and migration of the smelt and other fish inhabiting the river. In addition, he studied the microscopic Crustaceans from Quill lakes, which had been obtained during the early summer; Dr. F. C. Hainsman, McDonald College, spent a short period at Saint Andrews superintending the scheme for studying of fish bacteriology; Professor Cox, Fredericton, concluded the important study of the life-history of the tom-cod. The Station was fortunate in having Professor Clara Benson at Saint Andrews, carrying on elaborate investigations into the chemistry of the flesh of various fishes; and Miss McFarlane, Toronto; Miss Symons, McGill University, and Miss Williamson, Columbia University, engaged in the bacteriology of lobsters, clams, etc., the last named also studying the important question of the alleged shrinkage in weight of lobster meat after undergoing the canning operation; Dr. F. S. Jackson, McGill, completed some remarkable studies on the changes undergone by the muscle of fishes during the freezing process, a subject of very great practical importance from a food point of view; Pro-

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fessor J. W. Mavor, Schenectady, continued his important work in determining the movements of water in the Bay of Fundy, his results, which included the summarizing of a large number of records of floating bottles placed in the currents of the bay, seem to show that these are much more complicated than had been supposed, and the whole investigation will be one of very great interest when published; Professor Connolly, Antigonish, N.S., made a biological study of the young stages of certain Decapod Crustaceans; Miss E. K. Chant, Toronto, completed a report of the life-history of the smelt of the locality, including a very interesting study of the eggs and young stages; while Miss M. A. Reid, of Toronto, pursued investigations upon the eggs and changes in the life-history of a peculiar marine animal, called Sagitta. Professor A. Vachon, Laval University, Quebec, made chemical and physical examinations of samples of water from western lakes, including the Quill lakes. In addition, to the biological work carried on in the Station and in the waters adjacent to Saint Andrews, researches on the life-history of the shad were made by Mr. A. H. Leim, of Toronto, in the waters at the head of the Bay of Fundy, and Professor Knight, Mr. D. A. McKay of Ottawa and Professor A. B. Dawson, Loyola College, Chicago, completed further investigations on the lobster fisheries, which have formed the subject of elaborate studies for several seasons. The researches of the young lobsters and their behaviour in early life formed an important part of the work, and a report of great value to the fisheries is in preparation. The board took advantage of an opportunity which offered itself of procuring biological collections from the east shore of Hudson bay and James bay. Mr. Frits Johanssen was given by the department a sufficient vacation to visit these regions, where very little hitherto has been ascertained as to the biology and general conditions of the fisheries of these waters. This observer was instructed by the board to visit this remote area and has brought back a very important collection of fishes and all marine life, which will be of unusual interest when reports upon it are completed.

Professor A. D. Robertson, London, Ont., assisted by Mrs. Robertson and a small staff, extended his oyster studies on certain important beds in Prince Edward Island. The several reports which Dr. Robertson has previously made upon the oyster areas will receive important additions and be supplemented extensively by a further report on the work carried on during the season of 1920. Professor A. G. Huntsman, curator of the Station, and who had general direction of the biological researches carried on, was at Saint Andrews from June to late October, and in addition to his onerous duties as head of the Station, he studied the influence of light on the growth of mussels, and superintended the smelt and Sagitta investigations, as well as conducting the dredging and other investigations in the open sea.

Much material has been supplied to Principal Harrison to aid him in his investigations at MacDonald College upon the canning of lobsters and curing of fish; and Miss Fritz, of Toronto, also continued the study of material which had been collected on the Miramachi region in 1918.

A very important piece of work was carried on from October 8 to 12 in a series of tow-net operations off Southern end, Grand Manan, in order to ascertain the distribution and movements from the spawning ground, in that vicinity of vast schools of young herring occurring there. In August and September several Hydrographic and Plankton expeditions were made in the Bay of Fundy when drift bottles were put out in order to obtain the records of the movements and currents desired by Professor Mavor, and some similar studies including a general Faunistic investigation, was made at the Minas basin and other waters at the head of the Bay of Fundy.

In September it may be added, that Professor Prince and Professor Huntsman left the Station to give technical instruction to fisheries officers at Truro, N.S., when a large assemblage of the inspectors from all parts of the Maritime Provinces met together under the chairmanship of Chief Inspector Ward Fisher, and a very successful

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series of sessions were held and important information on fish and fisheries imparted. Several biological lectures were delivered by arrangement in Truro at the same time and were largely attended by the Normal School teachers and the public.

The Fisheries Museum at the Station which has proved a great attraction each season, has been much curtailed owing to the necessity of placing research tables between the museum cases, a condition necessary owing to the very large staff of workers who attended during the season of 1920. A refrigeration apparatus divided into three compartments has been constructed for experimenting with frozen fish and other sea produce. An ammonia refrigeration machine has been installed, in order to control the temperature. The library has received considerable additions, and the catalogue has been very much extended so that the staff can make constant use of the valuable works now on the shelves.

The Biological Board has been impressed by the necessity of increasing the accommodations, both in the laboratory and in the residence for workers, as there is every possibility that the number of Canadian scientists in future seasons will be greatly increased and accommodation must be found for them. The heating and lighting of the buildings requires also improvements, and a plan for extension and for installing electric light, etc., is now before the Board.

Pacific Biological Station, Nanaimo, B.C.—The Station at Nanaimo has had a very profitable season under the direction of Dr. C. MacLean Fraser. In addition to important Faunistic and fishery investigations conducted by Dr. Fraser himself, Mr. C. Berkeley, the assistant, has also been engaged in chemical and bacteriological investigations. The staff included a number of workers from the University of British Columbia and it is certain that in the future there will be an increasing number of able workers sent to the Station each season from the university. Dr. Fraser was offered the Professorship of Zoology by the University, which he accepted after consultation with the Biological Board and the completion of an arrangement whereby he can still continue as head of the Station and direct all investigations. He will also carry on his work in the university as professor, which will be invaluable to the work at Departure bay. Professor A. T. Cameron, Winnipeg, resided at the Station during the season and carried on some valuable researches in addition to the splendid investigations which he had begun in British Columbia waters in the spring season. Professor J. B. Collep also returned to the Station and engaged in some very elaborate biochemical investigations upon certain fish and other forms. A considerable amount of Faunistic work was done and a series of problems relating to fisheries which the department in Ottawa had handed to the Biological Board, were investigated at the Station and reports upon them have been prepared or are in course of preparation.

The biological volume which was announced as nearly ready for publication last year has been delayed, and this delay has enabled several new papers to be included so that the publication entitled, "Biological Contributions, 1918-20," will include no less than sixteen very valuable reports containing original results on fishery and other investigations carried on by the staff at both laboratories. There is a great demand among scientists in Canada and the various parts of the world for these publications, which are sent to a large number of the principal libraries in the Dominion and Europe. It may be added that Professor Prince, after occupying the position of chairman of the board for over twenty years, has retired from that position, and Dr. A. P. Knight, of Kingston, has been chosen for the position, but Dr. Prince will continue to act as secretary-treasurer of the board. Professor Ruttan, it may be added, has replaced Professor Adami as representative of McGill University, Dr. Adami having accepted the position of Chancellor of the University of Liverpool, England.

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REVIEW OF THE FISHERIES OF 1920

The year 1920 has been a rather trying one for the industry as a whole. During the war, and since, the cry of the world has been for increased production of food. To this cry the fishing companies and the fishermen, even though inroads had been made on their numbers by enlistment, splendidly responded; but since the armistice there has been a serious drop in the consumption of fish and a consequent slowing down in the demand therefor. One result was a sharp reduction in the prices of fish, but unfortunately this reduction reflected itself more speedily and in greater degree on the producer than on the consumer. On the other hand the equipment with which the fishermen were supplied had been purchased at high-water prices, and from which there was little reduction when replacements had to be made during the year.

The canning industries on both coasts have carried on under heavy handicaps. The prices paid for tin plate were very high and labour costs continued heavy throughout the season.

While owing to these and kindred conditions the year has not been as successful as would be desired, the industry faces the coming season in a healthy and vigorous condition. It realizes as it has never realized before that if Canada is to take the place in supplying the markets of the world that her premier fishery resources warrant, our fish must be so prepared for market as to favourably compare with the best from any other country, and that if our domestic demand for fresh and frozen fish is to be rapidly expanded, not only must fish in perfect condition be placed in the hands of the consumer but at moderate prices. Arrangements are being made accordingly to a greater extent than ever before.

The department has been doing much to stimulate improved methods of handling and curing fish, by investigation, and affording information, by publicity, and by obtaining needed legislation.

The compilation of the detailed statistics of the fisheries for the year 1920, which are now published in the form of a separate statistical report by the Bureau of Statistics, has not been completed at the time of writing, consequently an estimate only of the total value, and a general summary of the results of the year's operations, can be given here.

The marketed value of all fish and fish products is estimated to amount to approximately \$50,000,000. This is a decrease of about \$6,000,000 compared with the value for the preceding year. The decrease is chiefly attributable to a diminished pack of fall salmon in British Columbia, and a poor demand therefor; also to a smaller catch at lower prices of cod, haddock, and such like fish of the Atlantic coast.

ATLANTIC FISHERIES

Cod, Hake, Haddock, and Pollock.—The greater part of the catch of the four kinds named above is split, salted and dried, for consumption chiefly in foreign markets where it comes into competition with products of the same nature from Newfoundland and the United States, Norway, Great Britain, etc. As a result of the unsettled condition in which the business of the world still is since the ending of the war, and the landing of prewar supplies by the fishing fleets of Europe those markets have become temporarily blocked. Consequently, prices fell off the second half of the year especially, and many fishermen finding themselves unable to continue, gave up fishing and sought other occupations, with the result that the aggregate catch of these fish under review fell below that for the year before by approximately 1,000,000 cwt.

Mackerel, Herring, and Sardines.—The mackerel fishery was not as successfully prosecuted as in the preceding year, owing to rough weather in the early summer, and the fact that the fish did not come close to the south shore of Nova Scotia in

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their usual numbers. The catch of that province, which furnishes the bulk of the total catch, fell off by about 90,000 cwts. There were decreased catches in New Brunswick and Prince Edward Island also, but the Magdalen islands' catch was substantially greater.

The herring catch of Nova Scotia was about 20,000 cwts. less, while that of New Brunswick was 180,000 cwts. greater than in the preceding year. The New Brunswick increase, however, was neutralized by a decrease in Quebec, particularly at the Magdalen islands.

The sardine fishery of the Bay of Fundy was financially a poor one: The catch was nearly as good as the preceding year's one, but the prices paid by the canners were too low for profitable operation of the weirs. This industry has not yet recovered from the slump in the demand for the canned product which took place at the close of the war.

Other Sea Fish.—The catch of halibut was about 40 per cent less than in the preceding year. The landings of swordfish, albacore, flounders, and tomcod, were considerably less also.

Shell-fish.—It is very gratifying, especially under present conditions, to be able to report that on all parts of the coast the lobster fishery, which is one of the most important of our fisheries, gave excellent results with regard to both quantity and value, so far as the fishermen were concerned at least. Some of the packers and dealers, however, were not quite so fortunate. Much of the canned product was held for higher prices than were offered at the opening of the season, but in the face of an accumulation of stocks and of falling market, sales were ultimately made at considerably less than the first prices offered.

The present regulations seem to have at last arrested the diminution of the stock of this shellfish, which would appear to be now capable of maintaining itself naturally.

About the same quantity of oysters was taken as in the preceding year. The prices were somewhat easier. The total quantity of clams taken was less. This was possibly due to the fact that fewer clams were required for bait owing to the curtailment of line-fishing operations. Quite as many clams were canned as in the preceding year.

The fishery for scallops was extended by the discovery of important beds in Digby basin and vicinity. The total catch, however, was not equal to that of the preceding year.

River Spawning Fish.—The Atlantic salmon catch fell short of that of the preceding year. The smelt fishery resulted in a decrease of 15,000 cwts. In Nova Scotia and New Brunswick, the quantity taken was less, but in Prince Edward Island it was greater. The catches of alewives and shad were not quite so good as in the preceding year.

INLAND FISHERIES

In Alberta and Saskatchewan there was a decrease in the catch of all kinds of fish. There were fewer fishermen operating and winter fishing was delayed owing to the late formation of ice on the lakes, while the lack of snow made it impossible for operators to reach the more distant points where the best winter fishing takes place. The demand for fish exceeded the supply, however, and prices were somewhat higher than in the preceding year.

There was a decreased quantity taken from the lakes of Manitoba also. Winter fishing was a month later in being started because of the mildness of the winter. High wages in lumber and mining camps drew the number of men away from the occupation of fishing.

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PACIFIC FISHERIES

Salmon.—The pack of salmon of all kinds throughout the province of British Columbia was about 200,000 cases less than in the preceding year. The shortage was almost entirely in the pack of the varieties known as pinks and chums. The scarcity and high prices of food supplies during the war years caused these kinds to be accepted at prices equal to those paid for sockeye in the prewar years, with the result that large quantities were packed. Since the war ended, however, it has been found difficult to market pinks and chums. Consequently, not nearly so many were packed last season. In contrast to this, it may be noted that the expensive sockeye is as much in demand as ever it was.

The pack of sockeye in the Fraser river district, while not a great one, was considerably greater than that of the year before. An important contributory cause of this and also of the unusually large number of spawning fish said to have reached the spawning beds was no doubt the limited amount of purse-seine fishing in Puget sound by American fishermen, which permitted a greater proportion of fish to escape to the river and its spawning places further up. There was a greatly increased pack of sockeye in the Rivers Inlet district. The pack of sockeye in the Skeena river district was equal to that of 1917, but very much less than that of either 1918 or 1919. In the Naas river district, the pack was disappointing, as was also that of the canneries on Vancouver island. In the latter district the canneries are dependent mostly on fall fish, and as market conditions for such were not good, the pack was much curtailed.

Halibut.—The halibut fishery which centres at Prince Rupert was successful financially during the season of 1920. For a while in the summer time a shortage of refrigerator cars temporarily interfered with fishing operations. But, taken all through, the season was a good one financially.

Herring.—The chief seat of the herring fishery of British Columbia is in Vancouver island—in the Alberni district on the west coast, and the Nanaimo district on the east coast. The fish came in great quantities during the winter season and the catch was much larger than that of the year before. The great bulk of it was salted for shipment to the Orient but owing to financial conditions in that part of the world the business, for the time being, was not so good as it otherwise would have been. An increased quantity was used in a fresh and smoked condition throughout the province.

Other Sea Fish.—Pilchards appeared in their usual abundance on the west coast of Vancouver island. Four canneries engaged in the canning of this excellent food-fish and a much greater quantity was packed.

The fishery for cod and for flat fishes was satisfactory. The demand for these fish is increasing with a healthier and steadier local market.

Whales.—The Rose harbour, Naden harbour, and Kyuquot whaling stations were in operation, and 493 whales were caught. In the preceding year the catch was 432.

GENERAL.

The weather during the first four months of the year, especially on the Atlantic coast, was stormy and cold. Fishing operations were greatly interrupted thereby and much gear was either lost or damaged. Two steam trawlers were lost entirely. Unfortunately the prosecution of the fisheries, especially in the open sea, is attended with an annual loss of life. During the year under review, I very much regret to say, there were thirty-four lives lost, twenty-four on the Atlantic and ten on the Pacific.

In conclusion it affords me pleasure to state that the officers and clerks of the Fisheries Branch performed their duties efficiently and satisfactorily during the past year.

I am, sir, your obedient servant,

A. JOHNSTON,

Deputy Minister of Marine and Fisheries.

APPENDIX I

REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, EASTERN FISHERIES
DIVISION, FOR 1920

The reorganization of the division, undertaken last year, has not yet been perfected. A fair degree of success has been obtained, notwithstanding that the full permanent staff of officers have not yet been secured. Many of the new officers have shown a most intelligent interest in their work, and give evidence of a strong desire to thoroughly acquaint themselves with every phase of the fishing industry.

New and important problems vitally affecting the industry are constantly arising, and in the nature of things the ability of the staff will be heavily taxed to successfully meet them. I am confident that within a reasonable time, by proper training and efficient oversight, that the general administration of the division will show gratifying progress.

APPOINTMENT OF TWO INSPECTORS

Vacancies in the inspectorates of two of the more important districts will necessitate the appointment of officers for these two positions. Hon. Donald Morrison, the inspector for northern New Brunswick, died in November last, after a brief illness. Mr. Morrison was an efficient inspector. Mr. R. Hockin, for nearly thirty years inspector for eastern Nova Scotia, is to be retired on the appointment of a suitable person to succeed him. Mr. Hockin was one of the most experienced officers in the division; wise in counsel and cautious in decision. These two vacancies add to the difficulty of successful supervision.

GENERAL CONDITION OF THE INDUSTRY DURING 1920

In the report for 1919 reference was made to the abnormal conditions affecting the industry in consequence of the unexpected ending of the great war. The dealers were caught with heavy stocks on hand which, owing to the extraordinary world conditions, practically financial, could not be readily marketed, even at greatly reduced prices. In addition, the cost of supplies and the high operating expenses continued, forcing the dealers and manufacturers to greatly curtail operations, with the result that the volume of fresh and manufactured fish declined. These conditions resulted in greatly curtailing the operations of the shore fishermen. In some localities the catches did not bring returns sufficient to pay operating expenses and afford a means of livelihood, resulting in a considerable number of the fishermen engaging in other operations. The lobster fishery was practically the only principal fishery that continued highly remunerative to the fishermen.

The dealers were more heavily hit than were the fishermen, as the heavy stocks on hand were difficult to profitably dispose of owing to depressed markets. In other words, the dealers were in the unfavourable condition of being heavily stocked with the goods of the previous year, and therefore unable to encourage large catches for 1920.

The past year has therefore been the most trying for many years, notwithstanding that the total catches and values greatly exceed the catches and value of the normal year preceding the great war, when the total marketed value of the fisheries of this division was \$13,886,780. This total increased during 1915, 1916,

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and 1917 to over twenty-two and one-quarter million dollars. It will be interesting to note that last year the total marketed value for western Nova Scotia alone amounted to approximately \$5,982,367.

The catch of the Lunenburg fleet will show a shortage in value of considerably more than \$1,000,000 as compared with the previous year, notwithstanding that the catch was only about 4,000 quintals less.

The catch last year was 295,150 quintals, and the number of vessels in the fleet was 105, and therefore the average catch was 2,810 quintals per vessel for the season. This year with 117 vessels in the fleet and a catch of 291,475 quintals, the average is 2,488 quintals.

Last year the fishermen received \$14 per quintal for their first trips, and \$12 for their second and third trips, whereas this year the fish brought \$12.50 early in the spring, later dropping to \$9.25, while the summer catch sold as low as \$8.25, with large quantities remaining on hand.

With the present high cost of outfits, labour, etc., and if the fish bring only \$8.25 per quintal or less, a large number of the vessels will have operated at a loss. This also has affected the shipbuilding industry to such an extent that practically every shipyard in Lunenburg county and along the south shore engaged in building fishing vessels has been closed down, and the workmen are now going elsewhere to seek employment.

While for the four years, 1915-18, there were substantial increases in the catches of the principal varieties of food-fish, the increase in the marketed value of the catches was due almost wholly to conditions brought about by the war. Food became a world need of grave concern, and the fisheries were looked to to take the place of meats and other supplies required for the vast forces of the allied armies. Cost was of minor importance, and therefore every inducement was given to produce and manufacture fish-food products, with the result that there was a great and increasing rise in prices consequent to the increasing demand and increasing cost of operations.

The past year has been largely a year of readjustment to normal conditions, and the difficulties of the situation have been greatly aggravated by the large volume of goods which it has been difficult to dispose of at any price.

THE LOBSTER FISHERY

The lobster was the only leading fishery that was prosecuted with uniform success during the year. Indeed, it was the outstanding fishery. The weather was favourable and the catch and pack greatly in excess of the previous year. The fishermen were particularly fortunate, as high prices prevailed, and, consequently, the financial returns were large. The total number of licensed fishermen was 12,226; Nova Scotia having 8,253, New Brunswick, 2,099 and Prince Edward Island, 1,874.

The prices paid by the dealers in live lobsters for the export trade reached as high as 40 cents per pound, while the prices secured by the fishermen for the small lobsters for canning purposes constituted a record. In some districts 18 cents was paid, or 4 cents more than any previous year. Altogether the season was the most profitable to the fishermen in the history of the industry. The total catch was 399,299 cwts., as compared with 345,806 cwts. the previous year.

There was, however, a sharp drop in the prices secured for the canned product. For several years previous sales were made at from \$45 to \$48 per case. In the early season of 1920 the offers were below \$40 per case. Some of the packers and dealers were, however, expecting a repetition of the high prices of the previous year, and therefore large stocks accumulated, and when the prices continued to drop many of the packers were caught with large supplies on hand, and ultimately had to accept offers at less than \$30 per case, and in some instances as low as \$25 per case. The loss at these low prices was serious as they were insufficient to pay the cost of the pack.

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An interesting phase of this fishery was the increase in the catch of medium and large sized lobsters during the past two seasons, as compared with the two previous years. For some time the portion of lobsters of nine inches in length and over, as compared with the catch of small lobsters, was a matter of grave concern, as it appeared that in a few years the fishery would become so depleted that drastic action would have to be taken to preserve it as a commercial industry. This was especially true of the conditions existing in western Nova Scotia and portions of the Prince Edward Island coast. The increase in the proportion of large lobsters, particularly in the prolific district of western Nova Scotia, is attributed to the shortening of the fishing season to three months each year instead of five and a half months as formerly. Whatever may be the cause in this respect it is quite apparent that the fishery has been greatly improved the past several years. The total catches during the shorter season have been almost equal to the total catches taken when the longer fishing season prevailed, and it would appear that the danger of depletion has been overcome, and that the equilibrium between the yearly increase and the yearly catch may be maintained for many years.

There was a serious falling-off in the total catches of the other principal varieties of commercial fishes such as cod, haddock, pollock, herring and mackerel, due almost wholly to the fact that the returns to the fishermen were insufficient for profitable employment. The decrease of the mackerel catch was over 87,000 cwts. as compared with the previous year. Nova Scotia suffered most severely, as the catch for 1919 was about 162,000 cwts., while last year it dropped to 81,000 cwts. The falling-off was due to the abnormal weather conditions prevailing during the month of May, preventing the fish from approaching the shore or schooling near the surface.

SPECIFIC CONDITIONS

Prince Edward Island.—General operations were curtailed owing to the low prices, and many of the fishermen were compelled to engage in other operations.

Fine weather prevailed throughout the lobster fishing season from April 1, and resulted in large catches and increased pack. The total pack was 40,322 cases, as compared with 31,911 cases the previous year.

There was a slight increase in the catch of herring, but a decrease in the value. The smelt fishery was very satisfactory, showing an increase in catch and value. Other fisheries decreased in catch and value, particularly cod, hake and mackerel, the latter being the most serious.

While there was a decrease of over five hundred barrels in the catch of oysters, the sizes and quality was much improved. The prospect for increased catches from the areas in East and West rivers, and Vernon, Seal and Orwell rivers, are good, as the beds are in better condition than for some years. It is to be regretted that the blight, which has been affecting the areas of Richmond bay, continues. The beds in Hill river, Mill river and Lot 6 river are suffering apparently from the same blight, the entire catch of last year being destroyed.

New Brunswick.—With the exception of the lobster fishery, the operations of the past year were unprofitable to all engaged in the industry. Fish of all kinds were plentiful, and large catches taken by those who continued operations, but, unfortunately, the market conditions drove many of the fishermen out of the business.

In the Grand Manan district the line fisheries were abandoned. Buyers were hit heavily, as the markets were constantly falling, and the dealers were left in nearly all instances with large stocks on hand which were difficult to dispose of at any price.

The sardine fishery was financially disastrous to the fishermen. The run of fish was good, but the small prices paid by the cannery operators made profitable operations

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impossible. The season opened with prices of \$10 per hoghead, dropping within a few weeks to \$5 per hoghead. When it is remembered that two seasons previously the price ranged as high as \$70 per hoghead, it can easily be realized that a drop to \$5 was most disappointing. With a good run of herring a fair profit may be made at \$10 per hoghead, but it would be difficult, even under most favourable conditions, for the fishermen to pay operating expenses at \$5 per hoghead. Until the sardine markets regain their former buoyancy the present unsatisfactory condition of the fishery will continue.

The smoked-herring industry also suffered severely. This business is carried on extensively in the Grand Manan district, where a large amount of capital is invested, which in past years has made generous returns to both fishermen and operators. A record pack of smoked herring was put up, and the prospects were for a prosperous year but the prices dropped to the lowest level for many years. Some 300,000 boxes of smoked herring of the finest quality are in stock with no market in sight.

The lobster fishery was the one bright spot. A greatly increased catch was made, high prices prevailed, and consequently this fishery was most satisfactory. As an insight into the eagerness with which the fishermen engaged in this industry, it might be stated that one fisherman, fishing alone and operating 70 traps, sold nearly \$500 worth of lobsters in two weeks.

In the northern district lobster packing is extensively carried on, while in the Charlotte-St. John district there are no canneries, the catch being shipped alive chiefly to the United States markets.

Nova Scotia West.—The district comprising the seven western counties suffered to a less extent from prevailing unfavourable conditions than any other section of the Atlantic coast. There was a noticeable decrease in the catch of cod, haddock, pollock, and mackerel. The lobster fishermen had the best and most prosperous year in the history of the industry.

It should be pointed out, as showing the importance of the lobster fishery in western Nova Scotia, that 40 cannery licenses were issued and nearly 4,000 fishermen's licenses; 2,157 boats were engaged and 3,908 fishermen employed. The total number of traps operated was 280,000, having a valuation of \$482,000.

Eastern Nova Scotia, comprising the remaining counties of the mainland, experienced difficulties that taxed the ability of the dealers, and greatly embarrassed the fishermen, as the low prices secured by the boat fishermen, and the reluctance of the dealers to add to the stocks, resulted in curtailed operations. The steam trawlers with their heavy overhead expenses had to be kept in commission. While large catches were taken by the trawlers, it was found impossible to market the catches with any degree of profit. Indeed, in several instances, the losses were very heavy, particularly of catches landed at American ports. Two landings, one of 400,000 pounds arrived in bad condition owing to warm weather and had to be sacrificed, entailing large losses.

As in other districts already referred to the lobster fishery was productive and valuable.

Cape Breton Island.—This district did not escape the general prevailing conditions along the whole coast. Indeed, the past year was the most unprofitable yet experienced. Owing to the low prices for the catches fishing operations were largely suspended for a considerable portion of the year.

As in the other districts already noted the lobster fishing was carried on with gratifying success. The fish were plentiful, the weather uniformly fine and the prices exceptionally high, resulting in an increase in the catch and in the value of the catch. Six additional lobster canneries were established during the year, i.e., at Main-a-Dieu, Long Point, Eastern Harbour, Ingonish, Inverness and Fourchu.

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There was a decrease in the catch of cod with a decrease in value. Hawkesbury is the only port showing an increased catch, and this was due to the addition of one steam trawler to the fleet.

The decrease in the catch of haddock was large. Ingonish was the chief sufferer in this respect. Hawkesbury showed an increase. No catches of halibut were taken at Glace Bay or at Scatarie, while the catch at Port Hood and Port Hawkesbury was less than one-third the preceding year. Swordfish fishing was prosecuted with quite satisfactory success at Scatarie, Little Lorraine and Louisburg.

RIVERS AND INLAND FISHERIES

The rivers, streams and lakes of the Atlantic coast provinces constitute an amazing network of waters, nearly all of which are frequented by valuable anadromous commercial food-fishes such as smelt, gaspereau, bass, whitefish, sturgeon, and salmon. New Brunswick leads in the abundance of the varieties named.

The commercial salmon fishery produced a decreased catch as compared with 1919, the conditions being particularly unsatisfactory in the St. John river and tributaries and along the coast of Cape Breton, where the catch was almost negligible.

Sport fishing, particularly for salmon and trout, attracts many thousands of travellers and sportsmen to our rivers each year and constitutes a very valuable source of immediate income and employment. From a sport fishing point of view alone any reasonable expenditure for the conservation, protection and expansion of the river fisheries is justified.

But the value of the river fisheries is very much greater than from the sport fishing viewpoint alone. The valuable commercial fisheries such as smelt, gaspereau, salmon, etc., already alluded to, are wholly dependent on the condition of the river fisheries. These fish must have access to the rivers and lakes for spawning, and unless free access and protection is offered during the spawning seasons, both sport and commercial fisheries, so far as the anadromous varieties are concerned, will speedily be destroyed. And in addition the "off-shore" deep-sea fisheries will be affected by any depletion of the annual runs of the anadromous fishes, as the deep-sea fishes, which are caught in great abundance near the shores, are attracted shorewards by the feeding provided by the runs of the fish to the rivers for spawning.

In view of the above it should be apparent that the protection of the rivers and lakes is vital to the success of both the river and shore fisheries.

The demand for protection is growing from year to year. Many of the best and most prolific salmon and trout rivers have been almost destroyed by illegal fishing methods, and the agitation for more adequate protection is becoming increasingly insistent. Owing to the multitude and magnitude of the inland waterways it is physically impossible, except at most unreasonable cost, to give all the protection called for, but it should be possible and financially feasible to give a satisfactory degree of protection to the principal rivers and streams.

In New Brunswick such important rivers from a commercial and sport fishing point of view is the Restigouche, Miramichi, St. John, and the more important tributaries should have every possible protection. In Nova Scotia the Margaree, the Mira, Musquodoboit, Sheet Harbour, St. Marys, La Have, Medway, Mersey, Tusket and the Bear rivers are among the principal streams that should have every consideration. It is, however, quite impossible for the sixty-five or seventy officers employed for the whole of the Atlantic Coast Division to afford the protection desired, as their time is quite fully occupied in the multitude of duties in connection with the coast and deep-sea fisheries, and the supervision of the fishing generally. The appointment of special guardians is essential, and the perfecting of this service is

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in hand. Emphasis should not be laid on a cheap service, but rather on providing adequate protection. The total number of officers for the whole Eastern Division is hardly a sufficient force for New Brunswick alone.

It must be realized, however, that the vast extent of the rivers and inland waters, when the sparse portion along these waters is considered, should not call for the elaborate protection essential to adequately supervise the whole system of waterways, but every effort should be made to safeguard the fisheries of the principal rivers and streams and to insure the prosperity of the fisheries affected.

TECHNICAL EDUCATION

With reference to that portion of the report of last year dealing with the technical education of the fishermen, it may be said that after consultation with Professor Sexton, of the Halifax Technical College, who has the matter in hand, that it was not found feasible to attempt any direct work last year, as it is quite essential that much preparation was required in order to ensure the success of the movement. It is probable, however, that the preparation will be completed the coming summer, and several of the courses instituted before the end of the year.

The conference of the fishery officers of the division was held at Truro in the latter part of September, continuing for five days. The special features were covered by a syllabus prepared by the Biological Board on—

- (1) "Fish and their Environment."
- (2) "Migration of Fishes."
- (3) "Types of Gear."

The conference was of highest importance and carried on with signal success. It is a pleasure to report that a better appreciation of the character of the work and the fishery officers is already apparent. Administration and supervision was found to include more than the routine of duties incident to the enforcement of regulations and preparation of official reports. The fishery officers are no longer to consider the enforcement of the laws as the chief end of their endeavours. This attitude in the past has too often resulted in antagonisms and dissatisfaction. Under the higher conception of the duties of the positions the officers are being impressed with the fact that they are to assist and encourage the fishermen, and by careful study to be able to consult and advise the fishermen and dealers in all matters affecting the industry. The continued technical education of the officers is therefore essential, with the prospect that within a few years they may become experts in the fisheries in their respective districts. The conference for 1921 will be held at Charlottetown, P.E.I.

TECHNICAL INVESTIGATIONS

Special interest has been taken the past year in endeavouring to ascertain the primary causes of discoloration in canned lobsters. As it would appear that careless or imperfect processing methods were largely responsible, greater stress is being placed on the processes from the time the lobsters are taken alive from the waters until the canned product is ready for the market. Circulars to be placed in the hands of the canning operators are being prepared, and it is expected that careful compliance with the suggestions and instructions given will largely prevent any discoloration of the meat.

(2) Also, investigations are being hastened in the matter of the red discoloration occurring at times in dried fish, resulting in some instances of serious loss. A number of samples of affected dried fish have been forwarded to the Biological Department of the McDonald College, Montreal, for examination.

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SCALLOP FISHERY

As the former scallop fishery of Mahone bay, Lunenburg county, N.S., had been showing signs of exhaustion the past several years, action was taken to protect the fishery by the adoption of a regulation shortening the fishing season to a period from December 15 to January 20. Quite satisfactory catches, however, were made last year, each of the smaller boats engaged averaging about seven gallons, shelled, per day's fishing.

From information at hand it appeared probable that a scallop fishery might be developed in other portions of the coast. The fishery officers were therefore instructed to investigate the possibilities in their districts, with a result that it is apparent that a valuable fishery may be developed, as the fish are found to exist in considerable quantities at many points along the coast, including the Miminegash and Cape North districts of Prince Edward Island, Antigonish, Cumberland, Annapolis and Digby counties, N.S., and the Main-a-Dieu district, Cape Breton. Also, as in Quoddy bay, N.B.

The best and most immediate prospect, however, was discovered in Digby basin and the adjacent waters of the bay of Fundy, where there was found to exist large and valuable areas, and instant attention was given to the development of the fishery, which has been successfully conducted the past year. The catches are large, and will doubtless result in the development of remunerative industry.

Investigation should be continued to ascertain the extent and importance of the areas already discovered, and particularly in the Nova Scotia Bay of Fundy district.

TUNA FISHERY

The development of the tuna, or albacore, fishery is interesting. Considerable numbers of this species of large fish have been frequenting the coast for some years, but until quite recently they were looked upon as a nuisance by the fishermen, and when taken incidentally were utilized for the manufacture of farm-land compost, as they were not looked upon as a desirable food-fish.

Some ten or twelve years ago, however, a market was found in the United States, chiefly in Boston and New York, and considerable shipments were made each year from Clark's Harbour district of Shelburne county, realizing about 3 cents per pound. The market has been steadily increasing and shipments made this year were disposed of at 9 cents per pound.

No special effort, however, was made for capturing the fish until three years ago, when the several enterprising fishermen of Hubbards utilized a double-headed mackerel trap-net, which was operated off Hubbards during the tuna run. Catches were readily and profitably marketed in Boston at good prices, and in the last two years particular attention has been paid to the fishery.

The value of the tuna as a food-fish will compare favourably with any of the large fishes, the steak portions not being unlike a good quality of beef. Indeed, it is difficult to discern properly prepared chipped tuna steak from chipped beef. The flesh is held in high esteem by the Italian and Portuguese residents of Boston and New York and a good trade in the canned product could easily be secured for a large pack, particularly if put up in oil.

Canned tuna has already taken a good position in the retail trade. The chief difficulty in establishing a canned tuna industry is that the supply cannot be relied upon. A school may strike in at any time during July and August and not be followed by any other schools for several weeks. It is quite possible, however, with proper facilities, to preserve the catches in good condition for canning for several weeks, and thus provide sufficient supplies to stabilize the operation of a cannery during the season.

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There is little or no retail trade in tuna in the Maritime Provinces, for, as already noted, its value as a food-fish has not yet become recognized.

Early in September, about the close of the run, Messrs. Bach and Finn, the official photographers of the Department of Trade and Commerce, succeeded in getting a complete series of "shots" covering the fishery at Hubbards. The whole intensely interesting operation of "playing" the big fish in the spiller, killing and landing them, was most successfully secured. These pictures are, without a doubt, the only views of the kind existing, and will doubtless awaken much interest when they are shown on the screens throughout the country.

It should be said that a considerable number was taken in the trap-nets at Port La Tour, Shelburne county, in September, over one hundred being captured in one day.

MACKEREL CRUISING EXPERIMENTS

Among the interesting developments during the past year were the mackerel cruising experiments. The purpose of the mackerel cruising experiments was to locate the spring schools, and three of the fishery protection cruisers, the *Hochelaga*, the *Arras*, and the *Arleux*, with wireless equipment, were stationed off cape Sable early in May to watch for the approach of the mackerel schools.

Complete arrangements were made for the transmission of information to the radio stations, and its instant despatch to the telegraph operators at the principal points along the coast, and from these points to be communicated by telephone to the fishery settlements and stations. The whole south shore coast from Yarmouth to Canso was thus kept advised of the movements of the fish and the apparent volume of the movement.

THE FISHING SCHOONER RACE

Among the events of outstanding interest was the ocean race off Halifax between the Lunenburg fishing schooner *Delawana* commanded by Captain Thomas Himmelman one of the successful "killers" of the Grand Banks fleet, and the Gloucester fishing schooner *Esperanto*, commanded by Captain Marty Welch, a native of Digby county, N.S. The arrangements were in the hands of a competent committee of business men, and the publicity given the event aroused international interest, especially among the fishing fleets of the Canadian and American Atlantic coasts. The prizes were \$4,000 for the winner and \$1,000 for the loser. The race is expected to be an annual one.

PATROL BOATS

The patrol boats are continuing to perform essential service along the coast. While they are chiefly used for the prevention of illegal lobster fishing, their services are frequently required to assist the shore officers.

The *D* and the *Nelson* operated in Prince Edward Island, the *A*, *B*, *C*, *E* and *F* in Nova Scotia, and the *G*, *Phalarope*, *Hudson* and *Mildred McColl* in New Brunswick.

The *Seagull* has been taken out of the service, as the condition of her hull did not warrant the expense necessary to put her in good condition. She will be disposed of and not replaced. The *Hudson* was also laid up for similar reasons and will be disposed of. She was replaced by the *Mildred McColl*. One of the western Nova Scotia boats will be assigned to assist the *Mildred McColl* in the patrol of the large and important lobster fishing coast from Northumberland straits to Bay Chaleur. Other changes are in contemplation with a view to perfecting the service and reducing the operating costs.

The service rendered by the boats is of most valuable character, and cannot possibly be performed by any other means. The results accomplished since the inauguration of the service in preventing widespread illegal lobster fishing has been due very largely to the work of these boats.

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THE FISHERIES OUTLOOK FOR 1921.

A decline in the cost of fishing supplies and outfits is already taking place, and with this decline the fishermen will be more advantageously situated than during the past year, and therefore it is quite probable that the industry will be prosecuted with greater energy. Further, it may be taken for granted that the prices for the catches, with the possible exceptions of small lobsters for cannery purposes, will continue at least on a par with the prices prevailing the past year. Indeed with the resumption of operations by the dealers there is every reason to believe that the fishermen will receive higher prices for their fresh catches.

It must not be overlooked, however, that the trade has important problems to solve before any sound basis is secured for a permanent and successful business.

The fresh fish trade is comparatively small, and the prospects are that it will continue in this unsatisfactory condition unless methods are devised to take advantage of the markets. The Canadian is restricted to a few centres of population. The hazard of the trade, with distant centres such as Montreal and Toronto are not appreciated by the average consumer, and, indeed, owing to the nature of the trade, which demands that fresh fish shall reach the consumer at the earliest possible moment after being taken from the water, it has been difficult to very greatly increase the Canadian consumption of fresh fish.

In any consideration of the expansion of the industry the export trade must not be overlooked. The statement that there has been only a very inconsiderable increase in the catch during the past twenty-five or more years is quite true, and this lack of expansion must continue unless the export trade is increased. The Canadian market is limited. Our population is small, and the centres of population too remote for any appreciable extension of business. The expansion of the Canadian market must in the nature of the case depend largely on the increase in population.

It should be quite evident that the export trade is the key to a big trade door, and there is no sound reason why the fisheries of the Atlantic coast should not very greatly develop, and the industry profit, from the markets of the world.

REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA FISHERIES OF QUEBEC, FOR 1920.

The statistics, which I have already forwarded to the department, compared with those of last year, tend to show a considerable decrease in the fisheries of the Gulf Division both in value and quantities.

After my departure from Quebec, on the 10th of June, on board the *Loos*, about five weeks later than usual, with a view to undertaking the supervision work in the gulf, I visited the different sections of the district: North shore, Magdalen islands, Canadian Labrador, counties of Gaspé and Bonaventure, for the purpose of distributing as soon as possible the fishing bounties and licenses, of disposing of a number of complaints on the part of fishermen, and of making myself acquainted with the fishing operations carried out since the beginning of spring.

I observed profound uneasiness existing among the fishing population on account of the excessive prices of all commodities of first necessity, of the low value and scarcity of cod and salmon, of the loss of time caused by the presence of large schools of porpoises on the coast of the county of Saguenay, as well as of the high wages offered fishermen in the different lumbering enterprises in the interests of which there was a great demand for manual labour. At the beginning of the season it was easy

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to foresee what the final results would be. The two most important counties, those of Gaspé and Saguenay, excepting Magdalen islands, did not yield half the value of the preceding year. On the other hand at the Magdalen islands, owing to the abundance of mackerel and to extensive preparations made in the course of winter for lobster fishing, the result was equivalent to that of the season of 1919. A large decrease is also noted in the yield of the fisheries for Rimouski and Bonaventure.

At the end of June a large number of fishermen had already begun to move to small industrial centres and to cities for the purpose of looking for more lucrative employment; giving up, with the evident intention of not taking it up again, that trade to which they had devoted the occupations of their whole life. The wave of depression now sweeping over all our fishing villages, under the influence of causes which do not seem to be disappearing is such as to give birth to a sentiment of grave uneasiness for the future of the industry in that part of the country.

COD

This fishery, the most important of the Gulf Division, has been a failure; certain sections were particularly affected. On the north shore the migrations of porpoises in schools of thousands have caused considerable losses, and should their appearance in the gulf continue to occur from year to year, it becomes evident that they will drive away from that coast a good portion of the population. The capture of those animals, practised on a high scale, would be a source of benefit, but as it requires improved and expensive apparatus, it cannot be expected that local enterprise will take it up. They are much more noxious than dogfish and certain newspapers have even thought that the public powers should intervene and help to exterminate them in the same way as it is done on the coasts of France, where suitable vessels and boats have been fitted out for that purpose at the Government's expense.

In the Canadian Labrador cod-fishing is usually very active during the months of June and July. It was nearly a complete failure this year in the course of those two months on account of the jamming of ice, the absence of caplin and the prevalence of easterly winds. In the western part the results were disastrous for most fishermen; many have not even derived a sufficient amount of revenue to defray the dues on their trap-net licenses. In the eastern part those who have persisted in waiting for more favourable conditions, succeeded in making, in the first part of August, catches corresponding in quantities to the average of the past year.

At the Magdalen islands, owing to the low prices offered, fishermen neglected cod fishing and engaged in some more remunerative kind of fishery.

On the coasts of Gaspé and Bonaventure, cod has given the poorest yield ever recorded. The few fishermen who had not given way to the discouragement over the failure of their operations during the first months, got nothing but small quantities of fish at the end of the season.

SALMON

This fishery, which has been constantly declining these last years has suffered a further decrease. Several license holders did not even deem it advisable to set their nets and removed them after a few days of operations. This peculiar circumstance forms a topic of conversation among the interested who endeavour to explain the falling off by various views of natural history principals. If it is true that salmon have a tendency to come back to their breeding grounds or grounds already frequented by them after more or less long periods of absence without anyone being able to determine the temporary causes which incite them to act in this way, it would seem that there are, in the river and gulf of St. Lawrence, causes of a permanent character to explain their gradual disappearance from year to year. It is reasonable to believe that when

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they had access to all the rivers flowing into the St. Lawrence river, and as far as lake Ontario, to spawn at liberty, they could reproduce themselves with more facility and consequently assemble there in larger quantities.

But it is a well-established fact that nowadays salmon have ceased frequenting quite a number of rivers formerly very much appreciated by sportsmen. West of the mouth of Saguenay they have practically disappeared. Even east of the Saguenay we have observed, these last years, several other streams entirely depleted of fish or on the verge of being so, either for lack of supervision or for having been spoiled by sawdust, mill refuse, etc., or for lack of suitable fishways. Among other rivers, I may mention the following: Bergeronnes, Escoumains, Bersimis, Bec-séie, Rimouski, Matane, Cap Chat, Sainte-Anne-des-Monts, and Mont-Louis, which not long ago were frequented by an important number of anglers, and which are now considered as of little value. By devoting to those rivers particular attention, they would not perhaps recover their old prosperity, but they could at least be partially restored.

As the lumbering industry rapidly develops in the Gulf Division and has a tendency of extending eastward as far as the shores of all the rivers where it is possible to obtain lumber it consequently threatens those rivers with the same fate as other streams situated further west. As there will likely be soon a complete reorganization of the fisheries service throughout the district, it is my duty, I think, to draw, in a particular way the attention of the Department to the present conditions of our rivers. I am convinced that the decrease of salmon in the tidal waters is due to some explainable causes, and that their conservation for sport and trade purposes deserve, more than ever, serious attention and should be secured by the application of new protective measures.

The rivers of the counties of Gaspé and Bonaventure are generally more prosperous than those on the North Shore and those flowing into the St. Lawrence river.

LOBSTERS

The high prices paid in 1919 had encouraged both fishermen and canners to undertake more extensive preparations for the season of 1920. Owing to this increased activity, to the abundance of bait, and to favourable weather it is noted that this fishery has given a yield greater than that of the preceding year.

Expecting the county of Bonaventure, where there is practically no fishery overseer for its supervision, the regulations regarding lobster fishing were faithfully observed. Four legal proceedings were taken at the Magdalen Islands, but they related to offences committed in 1918.

MACKEREL

The mackerel fishery which is chiefly carried on at the Magdalen Islands, shows an appreciable increase compared with the catch of last year. Mackerel have a tendency to come back in increasing quantities into Baie-des-Chaleurs, a fishing area which had been deserted by them for some years. The fishermen of that locality are not equipped however for the carrying on of this fishery in a paying way, and little attention is given to it.

At the Magdalen islands, owing to the little care given to the handling and preparation of this fish for the market, the benefits derived from its industry are far from what we could reasonably expect. The rigorous application of the new regulations concerning the inspection of fish products which become effective in 1921 would tend, it seems to me, to remedy that abnormal state of things. If our fishermen were perfectly acquainted with the most suitable methods to prepare that fish as well as with the benefits to be derived by offering for sale a first-class product there seems to be no reason why our products should be inferior, as a food, to similar articles procured elsewhere.

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HERRING

Fall herring which could be obtained in nearly unlimited quantities in the eastern part of the Canadian Labrador seem to gradually come back to the fishing grounds from which they had disappeared for about thirty years. According to the fishermen of the neighbourhood of Bradore bay thousands of barrels could have been salted if they had had at their disposal the necessary apparatus to capture and prepare that fish.

At the Magdalen islands herring appeared in large quantities at the end of April and remained in Pleasant bay and around the islands until the month of June. As the fishing vessels in the habit of calling for bait were not numerous in the spring, several fishermen could not find any buyer for their catches, and were not slow to put an end to their fishing operations. For some years herring smoking has been regularly carried on in that locality, and the product has been easily and advantageously sold.

In the counties of Gaspé, Bonaventure and Rimouski, herring was rather scarce.

The conclusions to be deducted from the above observations may be summed up by stating that in the Gulf Division, excepting the Magdalen islands, the fishing industry which was rather backward many years before the war and which had regained a little activity during the period extending from 1914 to 1919, has fallen again into a lamentable condition. Cod-fishing, indisputably the nucleus of the industry, is particularly affected by different causes against which our fish dealers and fishermen are not prepared to struggle. The latter always entangled in their old methods and processes, improperly equipped and only practicing their trade as a last resource till they can find less trying and more lucrative occupations, are moving in a body to some other fields of activity. This is rendered easy on account of the fact that numerous new industries have been established in the district, in which they are sure to find employment.

By taking into account the number of fishermen having thus given up their trade, and of those intending to follow the example of the former, since they are offering for sale at a low price their fishing tackle, apparatus and boats, not more than 50 per cent of the number of fishermen for 1919, will remain for the 1921 season's operations.

The patrol season on board the *Loos* closed without any accident. Foreign fishermen while not appearing in large numbers on the coast of Labrador and the Magdalen islands, complied with all the local regulations.

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE FISHERIES
DIVISION, FOR 1920

In consequence of the reorganization of the service which went into effect on April 1, my office was moved from Indian Head, Sask. to Winnipeg, and the province of Manitoba was added to the districts under my administration. Judging from the results of the reorganization from April to the present date, it promises success along the lines for which it was made. As in all new systems, certain difficulties have from time to time arisen, but these have adjusted themselves to a very great extent, and under the conditions now obtaining everything is working smoothly and gives every promise of increased efficiency. In a few districts, where no overseer has been employed, owing to the previously employed overseer resigning, the situation has been met by placing a special fishery guardian to act until a permanent appointment of an overseer has been made. There appears to be a lack of men qualified for the position.

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of overseer, or who can qualify by passing the necessary examination. In all cases where special fishery guardians have been appointed returned soldiers have been given the preference.

In all three provinces there is a decrease in the catch. The past year has been most unfavourable for fishing operations. A very late spring shortened the fishing greatly at that season, a late fall delayed the formation of the ice on which operations are conducted in the winter until well into December, lack of snow made it impossible to reach the more distant points at which the most of the winter fishing is carried on, and a mild winter has reduced the operations, as it was not possible to be certain that the catch would keep in good condition, thereby limiting the catch.

On taking over the province of Manitoba I found that the regulations were not as well known or observed as could be wished and considerable difficulty was experienced in making it plain to the fishermen and some of the fish dealers that such a condition could not be allowed to continue. During the last three months a great improvement has been observed in this connection, it is simply a matter of treating the whole situation with firmness, and at the same time with justice and broad mindedness. I have every hope that in the near future I will have the co-operation of all fishermen in enforcing the regulations. I can say that I have had the fullest co-operation from all the larger companies conducting operations in the province and have found them willing to assist me in every way.

Inspector D. F. Reid died on September 2, after a lengthy illness, having been in the service of the department for a number of years. The vacancy made by his death has been filled temporarily by his son, Mr. C. F. Reid, who has given most acceptable service.

During the past year the sturgeon fisheries in the northern part of the province of Manitoba were opened to commercial fishing. It is, however, too early to give any definite opinion as to what may be expected of these fisheries; the catch not having as yet been brought out. Owing to lack of snow it was impossible for the fishermen to reach the fisheries until very late, so that no real estimate of their worth can be made at present.

The steamer *Bradbury* was employed on her usual work, placing buoys in lake Winnipeg, lighthouse work and taking care of the spawn at the different hatcheries, the late fall made it impossible for her to complete her work until much later than usual.

It is expected that in Alberta fishing for commercial purposes will be started at lake Athabasca during the coming summer. A cannery site has been procured by the Mackenzie Basin Fisheries, Limited, of Calgary, and I am informed that it is their intention to operate this year. This, however, depends entirely upon the question, of transportation, which at present is very poor.

REPORT OF CHIEF INSPECTOR, LIEUT.-COL. F. H. CUNNINGHAM,
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA), FOR 1920

The fishing season of 1920 was ushered in facing the entirely new policy of open fishing.

For many years there has been a restriction in the number of licenses which should be issued. This was one form of conservation by preventing intensive fishing in any one area. The number of applicants for fishing licenses had so increased that a change of policy became necessary, and to give every British subject an opportunity of entering the fishing business if he so desired, the restricted license policy was cancelled and the new policy of granting unlimited licenses to all British subjects of the white race and Indians took its place.

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For the purpose of seining licenses, the province was divided into twenty-one seining areas, for which a license was granted to fish in any portion of any one area. In the areas restricted to gill-net fishing, unlimited licenses were issued to the white race and Indians, and the number of licenses to be issued to other than the white race was restricted to the number operating during the season of 1919. This change in policy has practically eliminated all grounds for complaint that favouritism was shown in the issuing of licenses, and the new system appears to have met with the public approval.

With the advent of open fishing, it became necessary to look for some additional adequate conservation methods, and this was reached by placing fishing boundaries at the mouths of rivers inside of which no fishing was allowed, and further, the weekly close season was extended where conditions demanded, and in addition thereto, all fishing was stopped for the season on a given date in those areas where it was necessary to provide for an adequate supply of parent salmon on the spawning grounds.

Unfortunately, the market conditions for fall salmon were so limited that the pack of this commodity was greatly curtailed, and the total pack for 1920 of all species is 1,187,616 cases as compared with 1,393,156 cases for the season of 1919.

At the moment there is practically no demand for the fall varieties, and such demand as may exist is at prices which are below the cost of production. It is quite obvious that, to compete successfully in the markets of to-day, the cost of production must be largely reduced. One of the greatest competitors for the world's markets is the United States, where the raw material is produced much more economically than in Canada, under our regulations, which no doubt are more effective from a standpoint of conservation, but from the standpoint of competition are much more expensive.

A retrospect of the past fishing season is satisfactory so far as the run of fish to the various spawning grounds is concerned. The pack of 44,598 cases of sockeye for the Fraser river district is most encouraging, and in addition to this evidence comes in from all quarters that the spawning beds have been exceedingly well seeded. In fact, it is stated by J. P. Babcock, Esq., who has made a special study of the spawning grounds of the upper Fraser, that in no year since his knowledge of the Birkenhead river has he seen so many spawning sockeyes on the beds. This is most encouraging and satisfactory and tends to the optimistic views of many that the Fraser river will again come back to its former productiveness.

Of course, it must not be overlooked that fishing operations in Puget sound were limited; there being very few purse-seines operating in that area, and if the Puget sound operators are honest in their desire to assist in the building up of this river, restricted fishing must be practised by them for several years. Whilst south of the border, traps and purse-seines are allowed, nearly 500 purse-seines operating in 1917—in addition to nearly 200 traps, no sockeye are caught on the Canadian side of the line except by gill-nets, apart from six traps on the southwest shore of Vancouver island opposite to the American waters.

It is pleasing to refer to the large pack of sockeye at Rivers Inlet. One hundred and twenty-one thousand two hundred and fifty-four cases were packed, and a large number of fish were exported to canneries outside the Rivers Inlet area. This pack comes well up to the big one of 1915, when 130,000 cases resulted from the season's operations.

The one disappointing area in District No. 2 is the Naas river, where only 16,740 cases were put up, as compared with the normal pack of some 30,000 cases. It is maintained by the operators and fishermen that the American traps, operated in American waters, are taking sockeye headed for the Naas river and are thus depleting the run. This phase of the question is receiving the attention of the authorities both at Ottawa and Washington, and it is hoped that, if conditions are as stated, a solution will be found before it is too late.

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The run of sockeye to Rivers Inlet and Smith's Inlet was beyond all expectations and both fishermen and operators were more than satisfied with the results. It is also reported that the spawning beds of this area were seeded to capacity. As you are aware, no fishing of any kind was allowed in Quashela creek or Wycluse lakes—consequently after the salmon entered Quashela creek they had free access to their spawning grounds.

Conditions in District No. 3, from a canning standpoint, were very unsatisfactory. With the exception of two canneries located in the vicinity of Victoria and one at Alert bay, all canneries in this district have to rely practically on fall fish—and as a consequence the pack is 179,196 cases less than in 1919. There were eleven canneries in this district which could not operate owing to market conditions for fall salmon. This effect was most noticeable on the west coast of Vancouver island, where large catches of chums obtained in 1919, the fishing of 1920 being negligible. The limited operations were due entirely to market conditions and not to a scarcity of salmon, as on the whole there was a splendid run of all salmon indigenous to the waters of District No. 3.

The removal of obstructions from salmon streams has been carried on energetically throughout the whole summer by Engineer McHugh and his assistant, Mr. Hunt.

This work is most necessary and of great value. All the streams in the Owekayno Lake district were cleaned out, the Atnarko river at Bella Coola was greatly improved at a heavy expenditure; a number of streams in the Quathiaski Cove district were attended to—as well as others on the east coast of Vancouver island, and as a result, the fish now have unobstructed passages to their spawning grounds at all these points.

The past season has been a most important and fruitful one from the standpoint of improving the quality of the pack, especially that of the fall fish—pinks and chums. It must be remembered that during the years of the war, the slogan was "the greatest production in a limited time"—consequently the pack of salmon put up at the end of the season may not have been equal in quality to the production of former years, but this is not a single instance, as all lines of goods manufactured suffered in the same way from greater production.

The salmon industry now realizes that the former high standard of quality of the salmon pack in British Columbia must again be attained, and with this object in view many conferences were held to discuss ways and means. It is felt that rigid inspection, either at the canneries or after the pack has been processed, is necessary to reach the desired end.

Many views were expressed, but whilst there is agreement as to the need for continued inspection, it is an open question as to whether this should be an inspection of the fish at the canneries or after they are in the cans.

It was finally concluded that the inspection of the fish before being processed in the cannery and of the sanitary conditions under which operations are carried on should only be attempted as at present, and that the provisions of the Meat and Canned Foods Act be rigidly enforced by the officers of the department.

This is valuable so far as it goes, but it is felt that it should go further and provide for full inspection of canned goods by Government inspectors, whether the product is intended for home or foreign consumption. Both the home and foreign markets desire goods of the highest quality, and if the markets for fall salmon are to be brought back to their former magnitude, the public must be educated up to the fact that in purchasing a can of any species of salmon packed in British Columbia, it can be relied upon, and they are purchasing the best that can be produced in any country.

It is pleasing to refer to the visit of the Hon. C. C. Ballantyne, Minister of Marine and Fisheries, to the coast. Such a visit gave the opportunity for obtaining

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first-hand knowledge on fishing conditions as they exist in this province. It brought him in touch with all phases of the industry, as he met canners, fishermen and Government officials, and it is felt his visit will be of great value, both in administration and development.

Those interested in the fisheries of the province were also fortunate in having a visit by the Assistant Deputy of Fisheries, Mr. W. A. Found, who made a thorough inspection of all the fishing grounds covered from the boundary line in the south to the boundary line in Portland canal, as well as the west coast of Vancouver island. Meetings with canners and fishermen were held at several points, and many questions tending to the betterment of the industry were discussed and considered.

There is one question which has been the subject of regret extending from the Atlantic to the Pacific, and which is that there is no separate Department of Fisheries administered by an officer having the full authority of a deputy minister. This matter has been urged on the Government for years as a means by which this great national asset would be open to still greater development and improved administration. The additional cost would be nominal, as the Fisheries Branch has the equipment and officials necessary for a department, the only missing link being the deputy minister.

Coming to the question of fish culture, there has perhaps been, at no time in the history of the fisheries, such an interest taken in this work by the industry generally and the public at large, as at the present time. Columns have appeared in the press giving views and ideas as to how this branch of the service could be improved. Comparisons of the system in vogue in British Columbia as compared with the system in certain states of the Union have been made, and yet it has not been possible to bring forward any definite proof that the Canadian system does not give just as good results as the systems of other countries. It is the desire of the department and its officials to experiment in any direction which may tend to increase the results.

The present system has given splendid results. This is borne out by the fact that in whatever locality artificial fish culture is conducted, the run of salmon is normal—notwithstanding the increased fishing operations.

Public opinion is in the direction of retaining ponds in which fry can be held, especially sockeye, until they are one year old, when they will be liberated to follow nature's course.

Arrangements have been made to increase this system in connection with the Canadian hatcheries, and the season of 1921 will see retaining ponds at all the hatcheries in British Columbia, where the necessary facilities exist for constructing the same.

The success met with at the Oregon hatchery, located at Bonneville, has been referred to on many occasions, and there is no doubt that splendid work has been accomplished. It must be pointed out, however, that the locations of the British Columbia hatcheries do not offer the same facilities as Bonneville. In British Columbia we are subjected to tremendous freshets, which carry everything before them. The Bonneville hatchery is located on the railway, which provides adequate facilities for the transporting of food supplies. There is a steady supply of good water, which is not subjected to freshets at any season of the year.

The hatcheries in this province are located as close to the natural spawning grounds as possible and are consequently isolated and far removed from railway connection, and, in several instances, long distances from the steamboat routes—consequently the question of food for the young fish is a vital one and will require careful consideration and heavy expenditure.

In any event, every effort is being put forward in the desired direction, and every official connected with fish culture is taking up the question with the one desire of successful results.

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Mr. J. A. Rodd, the Superintendent of Fish Culture, made an inspection of all the hatcheries during the month of June, and went thoroughly into all the different methods attempted at the various hatcheries—such as the hatching of eggs in gravel, retaining ponds, and etc. He made suggestions at various places which no doubt will tend to improve conditions.

This officer also represented the department at the Canadian Fisheries Convention held in Vancouver. At this convention there were representatives of the whole Canadian fisheries, as well as visitors from the United States, who submitted papers on certain conditions of the fishing industry and the artificial incubation of fish life.

The convention was a wonderful success, and whilst good work was done by President A. H. Brittain and by every member of the association, it is pleasing to note that at the expiration of Mr. Brittain's term of office he was succeeded by a British Columbian in the person of Mr. A. L. Hager.

In closing, I may say that this will be the last report submitted by me as Chief Inspector of Fisheries for the province of British Columbia, as my retirement from the service dates from the 31st instant.

To the officers engaged in the administration of the fisheries and fish culture in the province of British Columbia I wish to convey my highest appreciation of the loyalty and valuable services they have given, and I feel assured that the same efficiency will be extended to my successor in office.

APPENDIX II

LIST of United States Vessels which entered Canadian Ports on the Atlantic Coast
during the Year ended December 31, 1920

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Acushla.....	70	25	12
Adeline.....	50	19	4
Agnes.....	65	18	4
Albata.....	20	7	1
Albert D. Willard.....	23	8	5
Alice M. Doughty.....	15	8	10
Angeline C. Nunan.....	58	13	4
Angie B. Watson.....	36	18	2
Arthur James.....	95	19	1
Athlete.....	96	25	5
Athena.....	56	17	1
Avalon.....	69	21	11
Bay State.....	81	25	11
Benjamin A. Smith.....	95	23	10
Benjamin W. Wallace.....	49	19	1
Catharine.....	103	22	6
Catharine Burke.....	68	19	13
Cavalier.....	96	20	5
C. E. Hopkins.....	44	16	1
Chelwina.....	16	6	1
Constellation.....	89	19	7
Corinthian.....	97	25	10
Cora Wells.....	13	5	1
Curlew.....	209	27	3
Dawn.....	79	21	4
Edith Silveria.....	47	16	3
Eleanor.....	36	9	5
Elizabeth A.....	12	9	10
Elizabeth N.....	102	23	4
Elizabeth and Ruth.....	38	17	10
Elizabeth W. Nunan.....	48	17	1
Eliza L. Spurling.....	49	19	1
Elk.....	66	23	3
Ellen and Mary.....	97	23	1
Ellen T. Marshall.....	75	23	8
Elmer E. Gray.....	71	20	7
Esperanto.....	91	22	5
Ethel B. Perry.....	56	15	1
Etta Mildred.....	45	16	1
Fannie Belle Atwood.....	81	16	2
Fannie E. Prescott.....	74	20	5
Flora L. Oliver.....	59	19	8
Flora.....	72	19	1
Frances S. Grueby.....	94	25	5
Funchal.....	20	8	6
Genesta.....	53	20	5
Gleanor.....	23	7	8
Good Luck.....	55	19	14
Grebe.....	203	28	1
Harmony.....	66	19	13
Harvard.....	72	19	3
Hazel R. Hines.....	79	21	9
Helena.....	40	17	1
Helja Silver.....	77	21	1
Henry L. Marshall.....	42	16	2
Herbert Parker.....	78	23	7
Heroine.....	149	21	2
Heron.....	208	26	1
Hesperus.....	79	25	12
H. Horton.....	34	12	1

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List of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Higco.....	12	7	1
Hortense.....	43	18	2
Imperator.....	79	25	9
Ingomar.....	85	23	3
James R. Clark.....	36	18	3
Jeanette.....	51	18	7
John A. Casey.....	14	7	1
John A. Cooney.....	36	9	7
John J. Fallon.....	60	19	3
Joseph Warren.....	11	7	13
John D.....	12	6	9
Josephine D. Costa.....	84	22	2
Joffre.....	80	25	11
Judique.....	89	7	1
Julietta.....	26	4	4
Killarney.....	73	23	12
Kineo.....	71	19	3
Lafayette.....	12	17	6
Laverna.....	95	22	1
Leonora Silveria.....	51	19	10
Louisa R. Silva.....	92	22	8
Lucia.....	43	17	4
Margaret.....	72	19	4
Mary de Costa.....	62	17	4
Mary E. Harty.....	77	18	5
Mary F. Fallon.....	46	15	2
Mary F. Curtis.....	65	19	6
Marshall Foch.....	64	23	9
Mary V. Goulart.....	66	25	2
Margaret and Ruth.....	77	20	1
Malte.....	17	9	1
Malicia Enos.....	8	5	10
Mildred Robertson.....	73	19	13
Minerva.....	13	6	6
Monarchy.....	83	19	5
Morning Star.....	85	22	7
Morten.....	17	9	1
Motor.....	17	9	5
Natalie Hammond.....	57	21	2
Nickerson.....	23	8	7
Nirvana.....	50	12	9
Nyoda.....	28	12	1
Osprey.....	169	27	1
Phillip P. Manta.....	43	18	3
Pioneer.....	128	22	1
Plover.....	208	27	1
Pollyanna.....	66	19	5
Ralph Brown.....	75	23	1
Reliance.....	22	7	4
Republic.....	48	19	10
Rex.....	75	23	11
Richard J. Nunan.....	55	17	10
Rita A. Viator.....	22	9	9
Romance.....	96	24	3
Ruth.....	49	17	9
Russel.....	66	22	1
Ruth and Margaret.....	77	23	8
Ryena.....	6	6	2
Sadie M. Nunnan.....	36	9	8
Sheldrake.....	208	28	1
Stilletto.....	91	19	2
Squanto.....	81	17	10
Sunapee.....	18	9	4
Teazer.....	59	19	10
Teal.....	209	27	1
Thelma.....	52	12	2
T. M. Nicholson.....	90	11	5
Togo.....	14	6	1

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LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920—*Concluded*.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Victor.....	75	19	4
Viking.....	34	18	5
Vida McKeown.....	83	20	4
Waltham.....	44	17	3
Waldo L. Stream.....	81	21	7
Walrus.....	246	26	1
W. H. Reid.....	9	6	8
Widgeon.....	205	28	2
Wild Goose.....	209	28	1

LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
A. & R.....	5	2	1
Ace.....	4	1	1
Acushla.....	10	3	1
Adele.....	5	2	1
Adeline.....	16	3	21
Agnes.....	17	5	3
Alaska.....	55	15	11
Albatross.....	40	13	35
Alf.....	9	2	2
Alfa.....	12	5	11
Alton.....	43	15	13
Altree.....	43	15	2
Alice B.....	13	5	5
A. M. Nixon.....	29	11	1
America.....	25	11	18
Angelus.....	4	3	1
Anise.....	3	2	3
Anna.....	5	4	1
Anna J.....	22	5	4
Annie.....	11	4	2
Apex I.....	15	4	1
Arctic.....	29	4	12
Arcadia.....	14	4	9
Arrow.....	4	2	1
Atica.....	12	3	2
Atlas.....	31	11	9
Atlantic.....	25	11	6
Augusta.....	19	5	5
Aurora.....	13	5	9
Baltic.....	20	5	3
Barnot.....	3	2	1
Bartalome.....	4	3	12
Bear.....	4	2	1
Beaver.....	9	4	14
Behring Sea.....	44	5	1
Bell.....	4	2	2
Betty.....	4	3	1
Bill R.....	39	6	1
Blue Sea.....	12	23	1
Blue Bird.....	4	1	3
Bravo.....	4	2	16
Bring Gold.....	12	5	10
rothers.....	13	5	8

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast
during the Year ended December 31, 1920—*Continued*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Bruce.....	2	2	1
Buddy.....	34	5	1
Ceaser.....	8	2	1
Carmen.....	28	7	2
Cape Spencer.....	11	4	10
Cape Clear.....	13	4	1
California.....	20	3	1
Castle.....	4	2	5
Carolyn.....	18	5	10
Castor.....	6	3	2
Cedric.....	7	2	1
Celt.....	29	6	1
Charlotte.....	4	2	1
Chancellor.....	13	5	11
Chimawa.....	2	2	1
Chimera.....	9	3	2
Christina.....	4	2	3
Clanex.....	12	4	1
Clara.....	10	2	9
Commonwealth.....	60	18	1
Commander.....	22	3	1
Companion.....	5	4	1
Confidence.....	22	4	2
Constitution.....	39	15	9
Convention.....	20	5	19
Cora.....	4	2	9
Corona.....	19	11	7
Crescent.....	14	5	11
Dague.....	4	1	1
Daily.....	25	5	12
Daisy.....	18	8	11
Deceiver.....	17	5	1
Defence.....	20	5	6
Democrat.....	27	6	8
Diamond T.....	8	2	6
Dick.....	10	5	4
Dime.....	6	1	1
Director.....	12	4	10
Doll.....	4	1	1
Dolly Dimple.....	4	3	1
Duce.....	6	1	1
Eagle.....	27	5	18
Eastern Point.....	4	3	16
Eidsvold.....	15	5	19
Einer Beyer.....	92	7	2
Elco.....	5	2	3
Eleanor.....	16	5	3
Elfia.....	5	2	1
Ellen.....	4	3	1
Ellen W.....	6	1	1
Elma.....	4	2	2
Elmira.....	4	2	1
Eloaese.....	8	2	2
E. L. Ray.....	7	3	1
Elsie.....	14	4	7
Elsinore.....	23	3	1
Emily.....	4	2	1
Emblem.....	4	3	1
Enrich.....	5	2	1
E. Neilson.....	15	5	5
Ethelyn.....	4	2	2
Eureka.....	5	2	1
Evening Sun.....	3	1	2
Evolution.....	17	5	15
Fairway.....	19	5	10
F. C. Hergert.....	15	6	8
Fighting Bud.....	4	2	1
Fisher.....	14	5	25
Flamingo.....	13	5	13

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men. in Crew.	Number of Times Entered.
Flattery.....	10	4	5
Fordenskiola.....	39	13	3
Fortescu.....	21	5	1
Fortuna.....	21	5	11
Forward.....	18	5	2
Foss No. 6.....	12	1	1
Fram.....	4	3	5
Frances M.....	4	2	2
Frances R.....	9	3	1
Genfurco.....	5	2	1
Gjoa.....	13	4	2
Glacier.....	12	4	12
Goney.....	12	5	10
Grant.....	5	2	2
Grayling.....	16	5	16
Gypsy.....	4	1	2
H. & R.....	4	3	23
H. B. Jones.....	23	7	2
Happy.....	12	4	2
Harder.....	8	3	2
Harvester.....	15	5	7
Hattie B.....	6	2	1
Hazel.....	7	4	1
Hazel H.....	25	5	5
Hecla.....	6	2	3
Helen.....	3	2	1
Helena.....	15	5	14
Helen D.....	8	3	6
Helegeland.....	56	15	9
Hesperus.....	5	4	1
Hilda.....	10	3	9
Hi Gill.....	4	3	1
Holdal.....	4	3	8
Home.....	9	3	1
Honey Boy.....	6	1	1
Hope.....	3	1	8
Hulda.....	6	3	2
Hutch.....	4	1	1
Ictus.....	5	2	1
Idaho.....	6	2	1
Imperial.....	23	5	8
Inger.....	7	2	1
Iris.....	2	1	1
It.....	5	1	1
J. A. G.....	8	2	1
Jean.....	9	4	4
Jennie.....	16	2	5
Jennie F. Decker.....	16	8	17
Joker.....	5	2	3
Johanna.....	15	5	13
J. P. Todd, I.....	4	2	4
J. P. Todd, II.....	12	4	3
Jugo Slav.....	33	3	1
June.....	9	4	4
Kasann.....	28	5	1
King and Wing.....	97	23	11
Kodiak.....	13	13	14
Kyak.....	8	3	12
K. 18.....	4	1	1
K. 225.....	3	2	3
K. 227.....	5	1	2
K. 619.....	4	2	1
Lansing.....	16	4	13
Lapaloma.....	44	11	6
Laura.....	7	2	4
Lawrence P.....	13	10	1
Lebanon.....	14	5	11
Leif.....	21	4	2
Lenore.....	14	4	3

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Leo.....	6	3	1
Leonine.....	24	4	1
Leonora.....	3	2	2
Liberty.....	44	15	25
Lilly.....	3	1	2
Lincoln.....	28	5	12
Little Jack.....	40	5	1
Livingstone.....	24	6	8
Louise.....	16	5	10
Lovera.....	4	2	6
Lubra.....	13	5	1
Lumen.....	10	4	12
286. L.....	5	1	1
Mabel A.....	22	5	8
Mabel C.....	4	2	1
Mackeral.....	8	3	10
Madeline J.....	21	5	8
Maghuel.....	6	3	1
Margaret F.....	10	4	4
Mars.....	9	4	9
Martha.....	7	4	1
Margaret.....	37	4	1
Mary.....	16	8	3
Mary B.....	22	5	1
Mary N.....	4	1	1
May.....	4	2	3
Memories.....	8	2	1
Mermaid.....	19	5	12
Mildred.....	19	8	12
Mira.....	4	3	7
Mobile.....	4	1	1
Mololo.....	9	11	18
Morengen.....	17	5	2
Myrtle.....	9	5	18
Narada.....	42	6	3
National.....	20	5	8
Nellie C.....	5	2	1
Neptune.....	3	2	1
New England.....	70	28	4
Niagara.....	13	3	3
Nidaross.....	13	5	25
Nip.....	4	2	2
Nomad.....	15	5	12
Norland.....	19	5	6
Nordby.....	9	5	1
Norma.....	6	3	14
North.....	9	3	14
North Cape.....	4	3	1
North Sea.....	5	1	2
Northland.....	4	2	4
Nule.....	6	2	1
Ocean Wave.....	10	6	1
O. K.....	7	2	1
Olympic.....	30	11	7
Omaney.....	34	13	8
Omaney.....	18	5	14
Oran.....	48	15	12
Orient.....	10	2	2
Osborne.....	16	11	13
Pacific.....	10	2	1
Pagebie.....	34	13	13
Panama.....	3	2	1
Papoose.....	14	5	11
Pauline.....	18	15	11
Pershing.....	24	1	1
Peerless.....	48	15	9
Pioneer.....	26	5	7
Pioneer III.....	20	14	1
Pirate.....	45	15	9
Polaris.....			

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Pollyanna.....	6	2	1
Preslio.....	17	5	7
President.....	24	6	4
Prim.....	4	2	1
Primrose.....	3	1	1
Progress.....	5	3	8
Prospector.....	50	7	3
Puffin.....	18	6	1
Quadra.....	29	6	1
Rainer.....	4	4	7
Reform.....	4	4	1
Reliance.....	14	4	17
Reliance I.....	19	5	22
Republic.....	51	15	10
Restitution.....	24	5	16
Retriever.....	7	3	2
Roald.....	12	2	1
Roald Amundsen.....	15	5	7
Roamer II.....	4	2	1
Rolfe.....	10	4	2
Romane.....	8	2	1
Roosevelt.....	13	5	10
Rosario.....	16	5	11
Royal.....	15	5	5
Ruth.....	10	3	1
Ryal.....	4	2	1
S. & S.....	4	2	2
Sadie.....	4	2	2
Sadie K.....	13	5	2
Salmora.....	20	5	3
Saltern.....	4	2	4
Sammy.....	8	3	1
Samson.....	7	2	11
Sands.....	4	2	1
Santa Rita.....	15	2	1
Scandia.....	79	17	9
Scout.....	5	2	2
Seahome.....	3	3	1
Sealion.....	6	2	3
Seattle.....	55	15	11
Searchlight.....	7	5	1
Senator.....	11	11	8
Sentinel.....	21	6	4
Seymour.....	44	15	7
Shamrock.....	21	3	12
Sherman.....	18	5	7
Signal.....	13	12	2
Siloam.....	16	5	13
Sitka.....	50	16	12
Sokol.....	7	2	3
Sophia Johnston.....	46	5	1
Speculator.....	9	4	15
Spencer.....	17	5	10
Star.....	12	4	8
Starlight.....	35	5	1
Starling.....	14	6	1
Success.....	4	3	2
Sumner.....	34	15	8
Sunland.....	26	11	1
Sun Wing.....	15	5	8
Superior.....	16	5	9
Swiftsure.....	22	5	12
Tahoma.....	18	11	11
Tarar.....	4	1	1
Tatoosh.....	24	6	12
Teddy J.....	13	5	7
Texas.....	16	5	20
Thelma.....	3	2	2

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List of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Concluded*.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Thelma II.....	26	5	7
Thelma M.....	7	2	1
Thor.....	4	2	2
Tillicum.....	21	5	12
Tip Top.....	9	2	2
Tom and A II.....	57	15	11
Topsy.....	6	2	2
Tordenskjold.....	39	13	8
Trio.....	19	5	1
Trip.....	19	5	1
Tyee.....	89	20	10
Tzartoos.....	22	6	2
T. 810.....	5/	1	1
T. 840.....	4	2	1
T. 865.....	3	4	1
T. 981.....	5	1	3
Uncle Salmon.....	32	4	13
Unimak.....	10	3	1
Uranus.....	15	5	11
Valden.....	10	10	1
Valid.....	8	3	13
Varnoose.....	16	3	1
Vansee.....	43	15	5
Ventura.....	5	2	4
Venus.....	25	8	14
Verbus Units.....	10	5	1
Verdun.....	8	2	1
Vesta.....	13	4	18
Victor.....	8	3	2
Victory.....	5	1	1
Viga.....	17	5	1
Viking.....	8	3	17
Vinland.....	4	2	4
Vivian.....	5	2	4
Volunteer.....	19	6	5
Washington.....	24	11	2
Wave.....	7	3	2
Westfjord.....	17	5	13
Whitestar.....	17	4	5
Whitman.....	26	5	1
Wildwood.....	13	2	7
Wilhelmira.....	17	5	10
Wilson.....	19	5	13
Wireless.....	17	5	15
Woodrow.....	23	5	1
W. 6.....	26	4	1
Yakutat.....	41	13	16
Yellowstone.....	22	6	10
Yes Bay.....	75	8	2
Yule.....	6	2	1
Zilla May.....	55	15	15

APPENDIX III

REPORT OF FISHERIES ENGINEER CHARLES BRUCE ON FISHWAYS
IN THE MARITIME PROVINCES, 1920

I beg to submit the following report on the condition of fishways in the various dams on rivers in the Maritime Provinces.

NOVA SCOTIA

Yarmouth County.—A fishway constructed by the town of Yarmouth in a small dam at the head of Yarmouth harbour, was completed during the summer, and is reported by the Overseer to be in an excellent and effective condition.

The changes to be made in the fishway in the Carleton power dam were not done this year as the alterations to the power plant were not completed.

Shelburne County.—A fishway was constructed by the Clyde Pulp Company in a low dam built during the summer on the Clyde river.

Queens County.—The fishways in the three lower dams on the Mersey river were repaired and a new one built in the fourth dam by the department. A new fishway was built in the fifth dam by the town of Liverpool. Enquiries to secure evidence that salmon were taken on the rod above these dams shortly after completion of the fishways as was reported, have up to this date not been replied to. It is probable that definite information will not now be available until next spring's run of fish enters the river.

The fishway built during the fall of 1919, in the Pulpmill dam on the Medway river, proved quite successful, large numbers of both salmon and alewives being taken above the dam during the past summer. This fishway, which was constructed of concrete, suffered some damage due to the fact that water was allowed to pass through it before the concrete was thoroughly hard. Repairs were made by the Pulp Company.

Lunenburg County.—Inspections were carried out on both the Lahave and Mush-a-mush rivers.

In the former the fishway in the second dam, owned by the Davidson Lumber Company, was considerably damaged by freshets during the spring. The company was making repairs to the dam and providing for complete repairs to this fishway.

The inspection of the Mush-a-mush showed that eleven dams exist all but three of which were equipped with fishways. The owners were served with notices to build fishways in these, but owing to a shortage of cement the work was not brought to completion this fall. On three of the existing fishways certain repairs were ordered in order to make them more efficient.

Halifax County.—As the fishway in the dam on the Musquodoboit river had become inefficient, due to the leaky condition of the dam itself, a portion forty feet long was removed from the dam to allow the free ascent of fish.

Guysboro County.—A fishway was built by the owners in a dam on the Salmon river, and is reported to be in good and efficient condition.

An opening has been made in the Isaac Fisher dam on the Antigonish branch of the St. Mary's river to admit the ascent of fish.

Colchester County.—A new fishway was built by the owners in their dam on the Economy river, which is reported to be in good and efficient condition.

An opening was made in a small dam on the Bass river owned by the Dominion Chair Company, to admit the free passage of fish.

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Cumberland County.—A new fishway was built by the owners in their dam on the east branch of the Apple river. This is reported to be in good and efficient condition, and the overseer states salmon have been seen some distance above the dam.

King's County.—A fishway was completed by the owners in their dam on the Gaspereaux river. This dam is thirty feet high, and the phenomenal success of the fishway for the ascent of alewives, literally thousands having passed through it, is considered as deserving of note. Previous to the construction of this fishway the highest dam, in which a successful fishway was in operation, was one in a dam on the Kouchibouguac river in New Brunswick, having a height of twenty feet. Owing to changes being made at the power plant during the summer and fall, as well as an extremely dry season, the water was very low, so that it is doubtful if any salmon succeeded in ascending the fishway. There does not appear any reason, from a structural viewpoint, why they could not do so, and it is hoped after the company completes the power construction so that final conditions can be determined that a rearrangement of the lower entrance of the fishway may remedy conditions.

Annapolis County.—The fishway in the dam on the east branch of the Bear river was rebuilt by the owners during the summer, the old structure having been in a poor state of repair. The new structure is reported to be in a good and effective condition. The fishway in the dam on the Lequille river, owned by the town of Annapolis, was repaired during the summer. These repairs were not carried out strictly in accordance with the department's instructions, but during an interview with the commissioner of lights for the town, he gave evidence that trout had been seen in the fishway at several points on its course. One of the chief difficulties to contend with on this river is that the flowage is so small during the greater part of the season that the electric power, in order to operate at all, drains the water below the upper entrance of the fishway. The town is building a storage dam further up the river to prevent this condition, and it is hoped this will tend to materially improve matters so far as the operation of the fishway is concerned.

A fishway was completed during the summer of 1919 in the dam on the Annapolis river at Lawrencetown. The department was confronted with a serious problem at this dam, in that the Annapolis is one of the few rivers on the Atlantic coast frequented by shad for spawning purposes, and, so far as it was aware, no successful fishway for the use of this fish was known. The dam is approximately five feet high with water at normal level. When this dam was built plans of a fishway to be constructed of wood were prepared and submitted to the owner. In building the fishway he departed from the plans, with the result that no shad ascended the river during the season of 1919. The matter was again taken up and it was decided, in rebuilding, to avoid wooden construction, and to cater as far as possible to the timid habits of the shad by so constructing the fishway that it would appear as a natural channel. In order to determine a safe grade for the fishway a study was made of the "rips" which occur below the dam, up which it was known shad had passed in large numbers. The fishway was then laid out and built according to the plans attached. The "rips" above referred to showed a grade of approximately one in fifteen, which was adopted as a maximum for the fishway. No partitions other than stone projections to retard the continuous flow somewhat were put in. These projections not only retarded the flow, but formed a deadwater below in which the shad could rest before ascending further. A width of not less than eight feet was maintained throughout, wider portions shown being due to the natural contour of the ground admitting of such without excessive work.

A condition which made construction at this place somewhat difficult was the fact that the material in excavations was entirely of clay and quicksand. Excavations were carried well back and faced with stone walls and the floors paved to prevent erosion. In spite of these precautions, a short time after the water was turned

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through it gullied out at the bend where the direction is changed and had to be filled in with heavy stone.

In the spring of 1920 when the shad entered the river a close observation was made at the fishway, and during one hour upwards of fifty were seen to pass through and into the pond above. Later evidence was secured that these fish had reached the spawning grounds. Salmon and trout also ascend this fishway.

NEW BRUNSWICK

Westmorland County.—During the summer of 1919 fishways were built in the Jones dam on the Petitecodiac river, in a dam owned by the Salisbury Lumber Company on the Coverdale river, and in the Jordan Sanitorium dam on the Pollet river, both these latter rivers being tributaries to the Petitecodiac.

In the summer of 1920 a fishway was built in the S. H. White dam on the Pollet river.

All of these fishways are reported to be efficient, so that the situation so far as this system of rivers is concerned is to be considered very satisfactory.

Charlotte County.—An opening was made by the owners in an unused dam on the New river which admits of salmon and other fish ascending to the spawning grounds.

An inspection was carried out at the falls on the Magagnadavic river at St. George, a report on which has already been submitted.

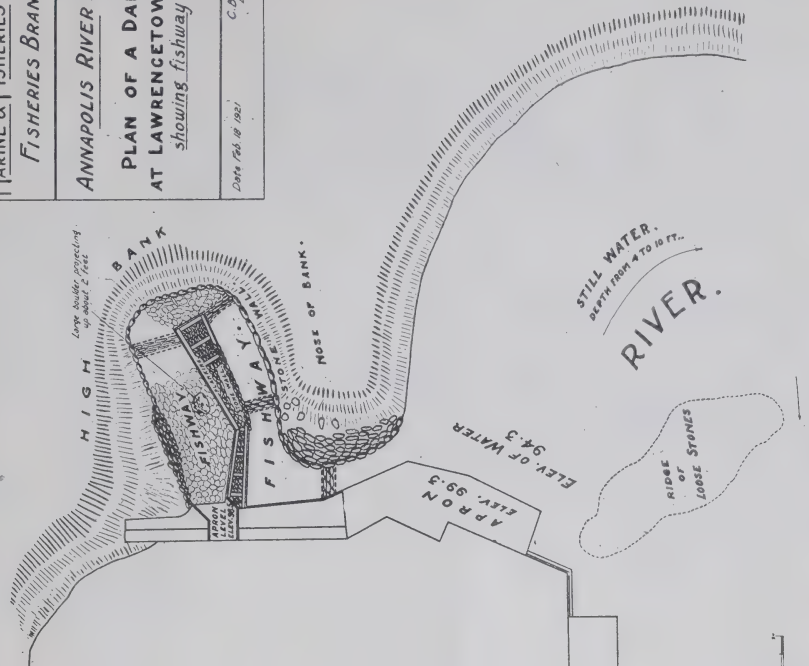
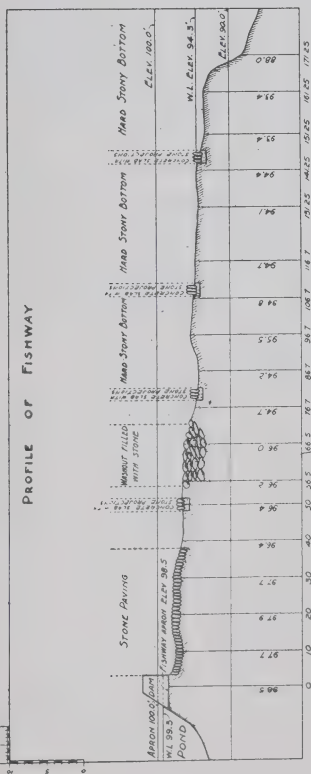
In general it may be said that the efforts of the department along these lines have been marked with a good measure of success. A number of problems will engage attention next year. It is desired to point out that the design of an efficient fishway constitutes an individual problem in each locality. No two dams present similar conditions, and quite frequently the conditions are not favourable owing in some instances to natural conditions and in others to the fact that the owners of dams have built them in such a manner that the placing of a fishway is practically impossible.

MARINE & FISHERIES DEPT.
FISHERIES BRANCH

ANNAPOLIS RIVER N.S.

PLAN OF A DAM
AT LAWRENCETOWN
showing fishway

Date Feb. 28 1921
C. Orin, Engineer



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APPENDIX No. IV

FISHERIES EXPENDITURE, 1920-21

	Appropriation.	Expenditure.
	\$ cts.	\$ cts.
Salaries and disbursements, Fishery Officers.....	710,000 00	709,449 34
Fisheries Patrol Service.....		
Oyster Culture.....	365,000 00	364,789 43
Fish breeding.....	25,000 00	15,622 18
Conservation and development of the deep sea fisheries.....	40,000 00	38,620 29
Building fishways and cleaning rivers.....	4,000 00	455 56
Legal and incidental expenses.....	5,000 00	1,500 88
Fisheries Intelligence Bureau.....	15,000 00	6,165 59
Inspection of canned and pickled fish.....	26,000 00	26,000 00
Marine Biological Board.....	15,000 00	4,690 11
Scientific investigations into fisheries.....	10,000 00	
International Commission—Fraser River.....	60,000 00	43,643 79
New patrol boats.....	21,645 55	21,645 55
Expenses Quebec Fisheries Reference.....		
	1,296,645 55	1,232,582 72
Fishing Bounty.....	160,000 00	152,519 30
	1,456,645 55	1,385,102 02
Unforeseen expenses.....		593 20
Cost of living bonus.....		85,599 61
Miscellaneous—gratuities.....		890 00
Reclassification of salaries.....		36,740 23
Totals.....	1,456,645 55	1,508,925 06

FISHERIES REVENUE, 1920-21

Licenses, Fines and Sales.	Amounts Collected.	Refunds.	Net Amounts.
	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	12,189 62		12,189 62
Prince Edward Island.....	3,720 12		3,720 12
New Brunswick.....	15,170 52		15,170 52
Quebec.....	6,540 15	3 25	6,536 90
Ontario.....	2,053 25		2,053 25
Manitoba.....	11,798 99	5 00	11,793 99
Alberta.....	8,698 75	5 00	8,693 75
Saskatchewan.....	4,082 30	5 00	4,077 30
British Columbia.....	239,102 04	5,820 00	233,282 04
Yukon.....	280 00		280 00
	303,635 74	5,838 25	297,797 49
Casual Revenue.....			7,362 44
Fish Breeding Revenue.....			13,295 89
Revenue under Pelagic Sealing Treaty.....			185,748 07
Premiums on exchange.....			24,560 59
Total.....			528,764 48

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APPENDIX No. V

The following is a statement showing the number of Licenses of the different kinds, issued in EACH PROVINCE during the 1920-21 Season:—

Kind of License—	QUEBEC.	No. Issued.
Lobster Packing.....	71	(2 $\frac{1}{2}$ cancelled).
Lobster Extensions, 19.....		
Fish Cannery.....	6	
Lobster Fisherman's.....	627	
Salmon Fishery.....	155	(2 cancelled and 1 free).
Herring Trap-Net.....	41	
Cod Trap-Net.....	272	
Receipt Books, 242 (1 canc.).....		
Rental of Salmon Fishing Privileges in the estuary of St. John River, 1.....		
		1,172 (4 cancelled and 1 free).
PRINCE EDWARD ISLAND.		
Lobster Packing.....	186	
Lobster Extensions, 120.....		
Quahaug.....	4	
Fish Cannery.....	14	
Lobster Fisherman's.....	1,880	(6 cancelled).
Oyster Fishery.....	224	(1 cancelled).
P.E.I. Trap-Net.....	3	
Smelt Gill-Net.....	201	
Smelt Bag-Net.....	230	(1 cancelled).
		2,742 (8 cancelled).
NOVA SCOTIA.		
Lobster Packing.....	165	(1 cancelled).
Lobster Extensions, 146.....		
N.S. Angling Permits.....	353	
Fish Cannery.....	15	
Lobster Fisherman's.....	8,258	(5 cancelled).
Smelt-Gill Net.....	273	
Smelt Bag-Net.....	218	
Oyster Fishery.....	150	(1 free).
N.S. Trap-Net.....	207	(2 cancelled).
Trap Net Extensions, 1.....		
N.S. Salmon Net.....	20	
N.S. Drag Seine.....	177	
N.S. Herring Weir.....	83	
Scallop Fishery.....	173	
Lobster Pound Licenses.....	8	
Lobster Pound Certificates, 326.....		
		10,100 (8 cancelled and 1 free)
NEW BRUNSWICK.		
Lobster Packing.....	184	
Lobster Extensions, 46.....		
Fish Cannery.....	7	
Lobster Fisherman's.....	2,104	(5 cancelled).
Scallop Fishery.....	10	
Clam Permits.....	81	
Herring Weir.....	644	
Bass Gill-Net.....	50	
Quahaug Fishery.....	52	
Salmon Fishery.....	496	
Smelt Gill-Net.....	103	
Smelt Bag-Net.....	2,337	(25 free).
Oyster Fishery.....	345	
Oyster Permits.....	130	
Bass Fishery.....	54	(5 free).
Sturgeon Fishery.....	3	
Salmon Net Permits.....	82	
Whitefish Fishery.....	18	
Lobster Pound Licenses.....	3	
Lobster Pound Certificates, 285.....		
Lease of Dark Harbour, 1.....		
		6,703 (5 cancelled and 30 free).

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MANITOBA.

Kind of License—	No. Issued.
Special Fishery.....	2,040 (1 cancelled).
Settler's Permits.....	401
Commercial Sturgeon.....	53
Domestic Sturgeon.....	Nil.
Special Angling for Non-Residents.....	Nil.
Receipt Books.....	1,124

2,494 (1 cancelled).

SASKATCHEWAN.

Fish Cannery.....	1
Sask. Commercial and Fisherman's.....	585 (1 cancelled).
Domestic.....	120 (1 free and 1 cancelled).
Indian and Half Breed Permits.....	632
Angling Permits.....	Nil.
Commercial Sturgeon.....	16
Domestic Sturgeon.....	10 (1 cancelled).
Receipt Books, 742 (5 cance).....	

1,364 (1 free and 3 cancelled).

ALBERTA.

Commercial and Fisherman's.....	699 (4 cancelled).
Domestic Sturgeon.....	Nil.
Domestic Fishery.....	146 (12 cancelled).
Commercial Sturgeon.....	Nil.
Indian and Half Breed Permits.....	272
Angling Permits.....	2,272 (5 cancelled).
Receipt Books, 846 (5 cance).....	

3,389 (21 cancelled).

BRITISH COLUMBIA.

B.C. Angling Permits.....	62
Fish Cannery.....	21
Indian Permits.....	164
Gill-Net, Drift-Net or Drag Seine licenses operated in conjunction with Power Boats.....	332 (5 cancelled).
Smelt or Sardine Fishery.....	77
Crab Fishery.....	186
Commercial Fishery for Salmon Trolling.....	1,858 (2 cancelled).
Salmon Cannery or Curing Establishment.....	66 (2 cancelled).
Salmon Trap-Net.....	19 (1 cancelled).
Salmon Purse Seine.....	162 (14 cancelled).
Salmon Drag Seine.....	45 (3 cancelled).
Sturgeon Fishery.....	3
Herring or Pilchard, Gill-Net or Drift-Net.....	48
Herring Drag Seine.....	2
Herring Purse Seine.....	41 (3 cancelled).
Salmon Gill-Net or Drift-Net.....	4,765
Reduction Works.....	8
Herring Drag Seine or Purse Seine for Halibut Fishing Vessels.....	Nil.
Boat License to buy fish from fisherman.....	169 (3 cancelled).
License to a person engaged in Cold Storage or fish packing to buy fresh salmon from fishermen.....	110
Whale Factory Licenses.....	3
Abalone Fishery.....	Nil.

8,141 (30 cancelled).

YUKON TERRITORY.

Special Fishery.....	22
----------------------	----

ONTARIO.

Cannery.....	1
--------------	---

Total number issued.....36, 128 (80 cancelled and 33 free).

FIFTY-FIFTH ANNUAL REPORT
OF THE
FISHERIES BRANCH

DEPARTMENT OF MARINE AND FISHERIES

FOR THE YEAR

1921-22

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1922

*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,
G.C.M.G., M.V.O., Governor General and Commander in Chief of the Dominion
of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-fifth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

E. LAPOINTE,
Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, July, 1922.

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DEPUTY MINISTER'S REPORT

To the Honourable ERNEST LAPOINTE,
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the fifty-fifth annual report of the Fisheries Branch of the department, which is for the fiscal year ended March 31, 1922. The report deals with the following subjects:—

Review of the Fisheries of 1921.
Operation of the Fish Inspection Act.
Operation of the Meat and Canned Foods Act.
Fisheries Statistics.
Bait Reporting Service.
Scouting for Mackerel.
Fishing Bounty.
Fish Culture.
Fishways.
Work of the Biological Stations.
Natural History Observations.
International Efforts to Replenish the Fraser River.

Appendices to the report include the following:—

Reports of Chief Inspectors of Fisheries.
Fisheries Expenditure and Revenue.
Summary of Licenses issued.
Entries of United States Fishing Vessels.

REVIEW OF THE FISHERIES OF 1921

The fishing industry was carried on during the year 1921 under the most trying conditions. The marketing of fish and fish products was found to be difficult, and prices fell to a figure which made it unprofitable for fishermen, in some districts of the Atlantic coast especially, to carry on. Production was thus much less than it otherwise would have been. It is not very surprising, therefore, to find that the marketed value of all fish and fish products for the year under review amounted to \$34,931,935. This total, which is the lowest since 1914, is over \$14,000,000 less than for 1920, and \$25,000,000 less than the peak value which was reached in the year 1918.

On the face of it this big decrease is a very serious one, but there are already abundant signs of improved marketing conditions for the product of the 1922 season, and it may be confidently assumed that the annual value of our fisheries has not only touched rock bottom, but will begin to rise steadily if more slowly than under the artificial conditions brought about by the late war. The total value for 1921 and that for 1920 was contributed to by the various provinces as follows:—

	1921	1920
Nova Scotia	\$ 9,778,623	\$12,742,659
New Brunswick	3,690,726	4,423,745
Prince Edward Island	924,529	1,708,723
Quebec	1,815,284	2,592,332
Ontario	3,065,042	3,336,412
Manitoba	1,023,187	1,249,607
Saskatchewan	243,018	296,472
Alberta	408,868	529,078
British Columbia	13,953,670	22,329,161
Yukon	28,988	33,100
	\$34,931,935	\$49,241,339

ATLANTIC FISHERIES

Cod, Hake, Haddock, and Pollock.—Owing to low prices and poor marketing conditions the aggregate catch of the four kinds named for 1921 was 2,509,928 cwts., against 2,707,059 cwts. for the preceding year. Hake, pollock and haddock, chiefly the last named, were accountable for the decrease. The landings of the Lunenburg Bank fishing fleet were rather less than in the preceding year. This was due to the fact that fewer vessels were engaged in the fishery. The average catch per vessel was actually greater than for many years.

Mackerel, Herring and Sardines.—Mackerel were generally more abundant than in the preceding year. The quantity landed in Nova Scotia, New Brunswick and Prince Edward Island, in the aggregate was approximately 18,000 cwts. greater, but this increase was almost neutralized by a decrease of 15,000 cwts. in the Quebec catch, mainly at the Magdalen islands.

Low prices and a poor demand for smoked round herring adversely affected the herring fishery. The total catch amounted to 637,414 cwts., against 935,122 cwts. for the preceding year. All the provinces shared in the decrease.

The sardine catch of the Bay of Fundy was the smallest for many years. As a result of the still disorganized state of the canned sardine trade the packers had difficulty in marketing the packs of the three preceding years. Consequently, prices were low and fishermen found it unremunerative to operate their weirs.

Other Sea Fish.—The halibut catch was greater by 7,600 cwts., while the catch of swordfish was more than double that for the preceding year. Albacore, flounders and tomcod were taken in about the average quantities.

Shell-fish.—The lobster fishery suffered considerably from inactivity as a result of the low prices, which caused a number of fishermen to cease operating. While the total catch was 6,360 cwts. less than that for the preceding year, some of the provinces actually produced a greater quantity. There was a decrease of 19,000 cwts. in Prince Edward Island, and of 8,000 cwts. in Quebec. Nova Scotia on the other hand produced 17,000 cwts. more, while New Brunswick also had an increase of over 4,000 cwts. It should be noted, however, in connection with the Nova Scotia increase that had it not been for the special fishery season allowed at the end of 1921, which produced 33,000 cwts., there would have been a decrease of 16,000 cwts. as compared with the regular fishing season in the preceding year.

There was a gratifying increase in the catch of oysters. All the provinces show greater catches, New Brunswick especially so. The increase amounted to 4,000 barrels.

Clams also were taken in larger numbers in all the provinces except Nova Scotia. The total increase amounted to 2,777 barrels.

The catch of scallops was approximately 1,500 barrels greater than in the preceding year.

River Spawning Fish.—The salmon fishery, which had been showing diminished catches for some years, suddenly produced an increase of 14,000 cwts. over the catch of 1920. That year, however, was much below an average one.

The smelt fishery was successfully prosecuted, and resulted in an increase of 25,000 cwts. as compared with the preceding year's catch.

The fishery for alewives or gaspereaux gave very meagre results. The catch was not more than about one-third of that of the preceding year. In the Harbour of St. John, New Brunswick, where the bulk of the total catch is usually taken, the fishery was almost a failure.

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INLAND FISHERIES

The lakes of the Prairie Provinces produced in the aggregate a somewhat greater quantity compared with the production in the preceding year. There was a decrease in value, however, of \$400,084. Notwithstanding a smaller number of men engaged in fishing, the catch in Alberta for commercial purposes showed a slight increase. An establishment for canning, smoking and salting fish was erected on the shore of lake Athabasca in the summer of 1921, and put in operation daily during the last half of September.

Fewer fishermen operated in Saskatchewan owing to the depressed condition of the markets in the first half of the year. The commercial catch, consequently, was slightly less.

There was an increased catch in the lakes of Manitoba.

The St. John River district in New Brunswick produced a slightly greater catch with a considerably greater value.

PACIFIC FISHERIES

Salmon.—The salmon pack of British Columbia amounted to 602,657 cases of all kinds. This is a little more than half the number of cases packed in the preceding year. The greatly decreased pack was due in a large measure to the lack of demand for the cheaper grades, such as pinks and chums, as a result of the oversupply in recent years. Unfortunately, however, the pack of the more valuable sock-eye was a very poor one. Not only was this the case in the Fraser River district, where dwindling runs of this variety are now noted without surprise, but it was equally so in the Naas, Skeena, Rivers Inlet, and outlying districts of the north. Spring salmon were fairly abundant in some of the northern districts, and the pack of this variety was greater. It was much less, however, in the Fraser River and Vancouver Island districts.

Halibut.—This fishery resulted in the landing of 325,868 cwts., against 238,770 cwts. for the year 1920. Nearly two-thirds of the total landings in British Columbia were made by United States vessels, mainly at Prince Rupert, where catches were disposed of and the vessels outfitted before returning to the fishing grounds.

Herring.—These fish were as abundant as ever on the west and east coasts of Vancouver island. The quantity landed annually varies as a rule with the condition of the markets, and the demand. The catch for 1921 was somewhat less than that for the preceding year owing to the temporary slackness in the demand for dry salted herring from the Orient. The demand for herring cured in the Scotch style was better in the eastern part of the United States. Efforts were made to pack a much larger quantity. A sufficient quantity of fish of the right quality was not secured, however, and the pack, although double that for the preceding year, fell far short of what was prepared for. Several companies operated purse-seines for herring at places within thirty miles of Prince Rupert during the season, and a very considerable quantity was taken. The fish were mainly disposed of for bait.

Pilchards.—These are very abundant on the west coast of Vancouver island. They are mostly canned. The pack of 1921 was only 16,091 cases, whereas the one for the preceding year amounted to 91,929 cases. The smaller pack was due altogether to poor market conditions. New outlets have been recently found for the canned product, however, and it is anticipated that the pack will increase in volume annually.

Other Sea Fish.—In addition to the foregoing, which constitute the chief kinds landed in British Columbia, such varieties as cod, flatfish, smelts, sturgeon, oysters, clams, etc., were landed in the usual quantities. These taken together contribute a considerable part to the total annual value.

Whales.—The market conditions were not such as to warrant the operation of the British Columbia whaling stations during 1921. Consequently there were no whales reported as having been landed.

INSPECTION OF FISH

Inspection of pickled fish and the barrels in which such are packed and marketed, was carried on during the season of 1921, under authority of the Fish Inspection Act as amended in 1920.

Under the original Act, packers of fish and makers of barrels were not obliged to either comply with the Act's requirements or submit their product for inspection. The amended Act, however, does make it necessary to have both fish and barrels in accordance with its provisions, and provides a penalty for infringement thereof. It also empowers inspectors to examine all pickled fish barrels and fish whenever and wherever it is convenient to do so.

The obligatory provisions in the Act entailed a much greater amount of supervisory and inspection work at the coopers' shops, the curing places and the chief receiving and shipping ports. The work was undertaken by a staff of four permanent and six temporary, or seasonal inspectors on the Atlantic coast, while one temporary inspector looked after the work in British Columbia during the fall and winter herring fishery there. The inspectors examined, approximately, 60,000 barrels of herring, mackerel, alewives and salmon. The number examined in the preceding year under voluntary inspection was 8,082 barrels.

The past season being the first in which the new Act was enforced, and as considerable stocks of empty barrels were carried over from the preceding year, it was found extremely difficult to rigidly compel compliance with all its provisions. A good deal of leniency was, therefore, exercised in using the power granted for prosecuting and penalizing offenders.

In every case, however, where a defect was discovered either in the barrel or fish, the inspector placed an official mark on the package to denote wherein they fell short of the requirements. He, at the same time, informed the barrel maker or packer personally, or by letter, of the shortcoming, and warned against its recurrence. This had the effect of bringing about good results with the least interruption of trade or irritation of traders.

Under this fostering system of inspection there has taken place all over the coast, a very remarkable improvement in the barrels now used for marketing pickled fish. The old leaky barrel of varied size and capacity, slimly held together with wooden hoops alone is being rapidly displaced by a strongly made, tight barrel of a standard size securely bound by iron hoops on the end.

As proof of the value and importance of the educative work that has been done in the barrel-making branch of the industry by our inspectors, and the excellent results already achieved, a number of letters of appreciation have been sent to the Department from time to time. Lack of space prevents the publication of all of these. One from a large firm of barrel makers in Nova Scotia, whose barrels, from the point of view of tightness and strength were previously not very greatly in favour, may be printed as a sample.

"We are getting quite a good demand for our barrels, and we are pleased to say that our customers all seem well pleased with them.

"We have to thank you for a large share of our success in giving them the kind of barrels that are satisfactory. Your advice has been worth a lot to us. We can assure you we appreciate all you have done in trying to help us to produce a better make of barrel."

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Improvement in the handling and curing of the fish is also very noticeable, although not yet to the same extent as in barrelmaking. An extract from a letter of a large dealer in, and exporter of, fish, will sufficiently indicate what has taken place in the curing and packing as a result of the work of our inspecting officers.

"The majority of the fishermen are honest, but you can hardly blame Tom Brown, when he sees his neighbour, John Smith, packing 160 pounds to a barrel and getting the same price as he (Brown) gets for 200 pounds, if he also begins packing light weight. It is not a secret in the trade that this practice had become practically universal previous to last year. We are, as you know, enthusiastic supporters of the Act, and while there may yet be room for improvement, we found conditions so much better in handling salted herring the past season that we would sooner give up this line of business than revert to the old haphazard system."

One other extract from a letter of a Nova Scotia dealer to one of our inspectors may be noted.

"We also take this opportunity to tell you that your efforts are showing splendid results. The packages are clean and well coopered, and most of the fish bright, well salted and pickled. The general appearance of products is to-day much better than ever before."

Those concerned with the shipment of dry salted herring from British Columbia to China have, from time to time, complained of the lack of uniformity in the cure of the fish, the size of the packages and the weight of fish contained in them. With a view to overcoming these conditions and setting the business on a more reliable basis, the department has been requested by the packers of and traders in this product to bring it under the provisions of the Inspection Act and establish standards for the cured fish and packages.

With the approval of the packers, a code of regulations dealing with this particular branch of trade is now being prepared, and it is expected that dry salting operations will be carried on next season under the supervision of this department's officers.

CANNERY INSPECTION

The provisions of the Meat and Canned Foods Act, in so far as they apply to the canning of fish and shellfish, are enforced by the department's outside staff of fishery officers. Under those provisions, canneries, the raw material to be used for canning, the whole process of canning and the canned product, including the labelling and designating of such, are subject to inspection.

During the canning season of 1921 there were in operation on the Atlantic coast 536 lobster canneries, three sardine canneries and twenty canneries in which clams and scallops and fish such as mackerel, cod, haddock and herring were canned. On the Pacific coast there were in operation fifty-seven salmon canneries, two herring and pilehard canneries and one clam cannery. At Lake Athabaska in Alberta a fish cannery was completed and operated towards the end of the season. The total number of formal inspections made and reported on during the season was 2,342. There were many more inspection visits to canneries which were not formally reported.

In view of the number of complaints as to the quality and colour of canned lobster meat turned out by some of the canneries on the Atlantic coast, the administrative officers of the department arranged with the Biological Board to carry on a campaign of education amongst the cannerymen concerning the causes of deterioration.

By direction of Dr. Knight, chairman of the Biological Board, demonstrators went from one cannery to another during the 1921 season showing by means of a miniature laboratory the growth of bacteria under unsanitary conditions and how discoloured and inferior quality of meat result therefrom.

The demonstrations were confined to Prince Edward Island. As a result thereof a pronounced improvement in the quality of the fall pack on the island was noticeable. This educational work is being extended to canners in Nova Scotia and New Brunswick during the 1922 packing season.

The Meat and Canned Foods Act provides that all canned fish imported for sale in Canada must comply with certain requirements as to labelling, weight, quality, etc. Packers or shippers of such in other countries are further required to furnish a declaration that their product has been manufactured from sound raw material and under proper sanitary conditions. The imported goods are, besides, subject to such inspection in Canada as may be deemed necessary in order to ascertain whether they conform to the requirements of the Act.

Many importations were held up in the course of the year because of improper labelling, while some were destroyed as unfit for consumption.

FISHERIES STATISTICS

The usual work of collecting, compiling and publishing monthly, quarterly and annual statistics of the fisheries was carried on by the Statistical Branch of the department. In addition thereto a start was made in the past year to collect special statistical information concerning the quantities and kinds of fish taken on the various fishing banks for the use of the International Committee appointed to direct scientific investigations of the deep sea fisheries on the western side of the Atlantic.

A number of deep-sea vessel captains have been supplied with forms for this purpose. The information sought on the forms covers the number of days spent in actual fishing on each trip, the exact location of the ground fished on each day, the catching power used and the quantity and kind of fish taken per day.

It is hoped that with the full co-operation of the vessel captains much valuable data relative to the fluctuations in the abundance of fish on the various fishing banks will by this means be secured in the near future.

BAIT REPORTING SERVICE

By means of the bait reporting service which has been in operation on the Atlantic coast since 1913, Masters of fishing vessels as well as others directly interested, were provided with information regarding bait supplies at various points along the coast, throughout the spring, summer and fall. Information regarding the landing of bait at various points along the coasts of the Maritime Provinces and Magdalen Islands was gathered by the officers of the department and transmitted daily by telegraph to certain ports, where the information was posted in conspicuous places. The information was also published free by the Halifax daily papers.

During the spring months telegrams reporting ice conditions and bait supplies were forwarded from Souris, P.E.I., Magdalen Islands and North Sydney, C.B., to Canso, Halifax and Lunenburg.

Throughout July and August information regarding bait supplies at points along the coasts of Halifax and Guysboro counties was transmitted by telegraph to North Sydney, Canso, Halifax, Lunenburg, Shelburne, Lockport and Yarmouth, while similar reports were also forwarded from Lockport to Halifax and Canso.

During the fall, from the first of September until the middle of November, telegrams were forwarded from Campobello, N.B., to Digby, Yarmouth, Barrington Passage and Lower East Pubnico, N.S., giving information concerning bait supplies in Charlotte and St. John counties, N.B. The above information was also transmitted by telephone from Barrington Passage to Clark's Harbour, Woods Harbour, and Port LaTour, N.S.

SCOUTING FOR MACKEREL

As in the preceding year the Fisheries Protection cruisers which annually follow the movements of the United States mackerel purse-seining fleet were instructed to observe the location and movement of the schools of mackerel as they approached the Nova Scotia coast and to send wireless reports daily to shore giving the results of their observations. The wireless messages were repeated by telegram to points along the coast for the purpose of keeping fishermen advised concerning the movement and volume of fish. This information is also utilized by those engaged in studying the natural history of the mackerel.

Cruising began off the western end of Nova Scotia early in May. On the 7th of that month a school of mackerel was seen off the county of Yarmouth. On May 11 and 12 two bodies of mackerel were discovered thirty to thirty-seven miles south of Cape Sable. These were moving in on the coast, one upon the east and the other on the west side of Brown's bank. Part of the school on the west side of the bank seems to have moved to the north and in conjunction with the school seen off the Lurcher shoal spread out along the western shore of Nova Scotia from Cape Sable to Port Maitland, where, diminishing in size, it remained until the middle of June, the fish having then presumably spawned and disappeared.

The main body of the schools on the east and west of Brown's bank came together and moved eastward between Roseway and the La Have banks. Part of the school proceeded towards the shore on the north of Roseway bank and on the 17th of May the fish were being taken about fifteen miles off McNutt's island, in Shelburne county; on the 21st twelve miles off the western end of Queen's county and on the 24th off La Have by United States seiners. On the 26th the main body reached Sambro bank, off Halifax harbour, where it remained for four or five days and where twenty-eight United States seiners operated successfully.

The fish then moved further to the east followed by the American seining fleet and on the 31st May were fifteen miles off Sheet harbour, on June 1 off Liscombe and on June 3 and 4 off Whitehead and Canso, about six miles.

The greater part of the main body then continued east along the coast of Cape Breton and passed Scatarie about six miles off. It proceeded north and east close to the shore until Cape North was reached when it turned into the gulf, part of it striking the Magdalen islands and part turned southward and westward towards Prince Edward Island. On June 21 the main movement seemed to come to a stop four or five miles off shore between East Point, Prince Edward Island, and Malpeque, Prince Edward Island, where such of the fish as still formed the main body, having reached the spawning stage, deposited their spawn. From the time the fish struck the western part of Nova Scotia portions of the main mass were left behind at points along the coast and as fishing continued for some time after the mass of fish had passed, they presumably spawned where they remained when the time came for that operation.

FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1921, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$7 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$5.30 each.

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There were 11,674 bounty claims received and 11,654 paid. In the preceding year, 9,671 were received and 9,664 paid.

The total amount paid was \$159,449.80, allocated as follows:—

To 586 vessels and their crews, \$46,147.30.

To 11,068 boats and their crews, \$113,302.50.

EXPENDITURE, 1921

County	Boats	Men	Amount	Vessels	Tons	Average Tons	Men	Amount	Paid	Ref.
			\$ cts.					\$ cts.		
Annapolis.....	144	239	1,410 70	1	60	60	19	193 00	145	
Antigonish.....	133	196	1,176 20						133	
C. Breton.....	301	532	3,119 80	16	217	14	56	609 00	317	3
Cumberland.....	3	6	34 80	1	11	11	3	32 00	4	
Digby.....	385	656	3,870 80	4	117	29	18	243 00	389	1
Guysboro.....	729	1,208	7,133 80	54	828	15	240	2,573 40	783	
Halifax.....	1,203	1,695	10,195 10	61	904	15	265	2,765 00	1,264	1
Inverness.....	341	723	4,191 30	22	321	15	101	1,039 20	363	
Kings.....	43	64	382 20						43	
Lunenburg.....	680	865	5,270 90	141	8,046	57	1,994	22,038 90	821	1
Pictou.....	45	67	400 10						45	
Queens.....	191	327	1,924 10	13	238	18	65	693 00	204	
Richmond.....	425	674	4,000 60	26	449	17	120	1,289 00	451	4
Shelburne.....	518	1,031	5,983 30	28	804	29	198	2,196 00	546	
Victoria.....	321	512	3,037 00	10	158	16	43	459 00	331	
Yarmouth.....	82	190	1,089 00	25	1,317	53	391	4,060 00	107	
	5,544	8,985	53,219 70	402	13,470	33	3,522	38,190 50	5,946	10
Charlotte.....	361	603	3,556 20	6	91	15	23	252 00	367	
Gloucester.....	194	446	2,566 20	152	2,252	15	655	6,859 80	346	
Kent.....	82	174	1,004 20	7	71	10	16	183 00	89	
Northumberland.....	1	3	16 90	1	21	21	4	49 00	2	
Restigouche.....	3	8	45 40	1	11	11	3	32 00	4	
St. John.....	7	13	75 90						7	
	648	1,247	7,264 80	167	2,446	15	701	7,375 80	815	
Kings.....	410	572	3,457 60	2	31	16	3	52 00	412	
Prince.....	349	703	4,113 30	7	99	14	23	260 00	356	
Queens.....	116	257	1,478 10	2	24	12	4	52 00	118	
	875	1,532	9,049 00	11	154	14	30	364 00	886	
Bonaventure.....	393	687	4,119 70	1	11	11	3	32 00	394	8
Gaspé.....	2,623	5,129	30,259 10	5	60	12	17	185 00	2,628	
Rimouski.....	138	215	1,294 70						138	1
Saguenay.....	847	1,333	8,095 50						847	1
	4,001	7,364	43,769 00	6	71	12	20	217 00	4,007	10
Totals.....	11,068	19,128	113,302 50	586	16,141	28	4,273	46,147 30	11,654	20

FISH CULTURE

Fish cultural operations during the calendar year 1921 embraced the fresh-water and anadromous species only, and were confined almost entirely to the more important commercial food fishes, such as Atlantic salmon in the east; whitefish, salmon trout and pickerel in the interior, and the Pacific salmon in the west.

A large part of the whitefish and pickerel eggs, and practically all the salmon trout eggs were obtained from the commercial catch, and the department is, therefore, largely dependent upon the co-operation rendered by and the success of the fishermen, for such eggs. The success or failure of the work is affected in many ways, but the weather conditions during spawning period is the principal factor. If it were not for the hatcheries, these eggs would be a total loss so far as the maintenance and replenishment of the fisheries is concerned.

The commercial species in the interior were distributed in a free-swimming stage, after the food sac was absorbed, on the natural spawning areas, and largely where the eggs were collected. The sporting varieties—speckled trout in the east, and rain-

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bow and cutthroat trout in the west—were handled in limited numbers. After adequate return was made to the waters in which the eggs were collected, the most of the balance was distributed in response to applications in public water. Small allotments were also made to privately controlled or leased areas on the payment of nominal prices and transportation expenses.

COLLECTION OF EGGS

Climatic conditions were extremely bad during the egg-collecting season in some districts, and were reflected in the number of eggs of some species that were obtained. Atlantic salmon rivers generally were in a satisfactory condition, and there were more salmon on the spawning beds than there have been for years in all the rivers where parent salmon are taken. Weather conditions on these salmon rivers were generally favourable and the full supply of eggs was readily obtained.

A change was made this season in the method of purchasing salmon for the St. John pond. Previously the salmon were bought from the commercial fishermen at their nets and transferred to the retaining pond by departmental officers. The number of salmon obtained in recent years has been small and the cost of the eggs was relatively high, as the overhead expenses under this method are the same for a few fish as they are for the full number that this pond will accommodate. This season the fishermen were paid for the salmon delivered by them in a satisfactory and acceptable condition at the pond. They, therefore, reaped any benefit there might be from careful handling, and this condition, coupled with the return of the fishing to normal, resulted in the pond receiving three times as many salmon as it did in 1920.

The salmon trap and retaining pond in the estuary of the York river, Gaspé basin, was suspended and the upper portions of the York river were inspected early in the season for the purpose of locating a suitable site for a trap-net and a retaining pond. No place was found where it was considered desirable to make the necessary outlay, and further tests were made during the summer with a trap or pound-net in the outer harbour. These tests were so encouraging that arrangements are being made with local fishermen to rearrange their nets and make them suitable for taking salmon for hatchery purposes next season. Towards the end of September two hundred and seven parent salmon for the current season were caught in seines operated by the hatchery staff in the Upper York above the best angling pools, and one hundred and fifty-six were caught in the Barachois river.

Twenty-three thousand landlocked salmon or ouananiche eggs were collected in the Metabetchouan river, Lake St. John district, Quebec. The location is rather isolated and the facilities for transferring green eggs therefrom are not favourable. It is, therefore, not advisable to continue operations in this direction until a hatchery for eyeing the eggs on the ground, and a suitable pond for retaining the parent fish through the summer, are provided. An initial effort was made by the acting superintendent of the Bedford hatchery to raise the importance and grade of that establishment by an independent collection of speckled trout eggs in that part of Nova Scotia. Water levels were away below normal and consequently the collection was not large although sufficient to justify further work along the same lines next year.

Whitefish were not as plentiful in two of the more important areas, and severe weather necessitated the liberation of quite a number of fish before they were stripped and the closing of operations at two points, consequently the total collection of whitefish eggs fell a little below the record collection of last year. All previous collections were exceeded in the Bay of Quinte and Georgian Bay districts. The grounds around Pelee island, lake Erie, were better organized and last year's collection in that particular area was doubled. There was a slight falling off in lake Erie, as a whole, in the Lake of the Woods, lake Winnipeg and lake Winnipegosis.

The weather during the salmon trout season was more favourable than usual and last year's collection was doubled. The collections were larger in all areas than they were last year. The largest increases were made in the districts covered by the Southampton and Port Arthur hatcheries. In the Great Lakes a low water temperature retarded the development of the fish in the retainers and the collection of pickerel eggs was small, but an increased collection in the Lake of the Woods district and lake Winnipeg brought the total above that of the previous year. In recent years a goodly number of pickerel have been caught in the commercial nets in the Point Edward district, lake Huron, early in the spring, but with the approach of the spawning season the catch fell off and consequently comparatively few eggs were available. An effort was made to hold these early fish in large pound-net retainers anchored alongside the commercial nets. This did not prove successful as the water was of such low temperature that the fish hardened instead of ripening.

In British Columbia climatic and water conditions as a whole were the worst in so far as the collection of eggs was concerned that have been experienced by the oldest hatchery officers. The unusual freshets washed out the hatchery pens and fences in several streams and did an enormous amount of damage to the spawning beds. In spite of these unfavourable conditions the total collection of sockeye in each of the four important hatchery areas was larger than it was in the corresponding year of the cycle. The run of sockeye to the Lower Fraser, particularly the Harrison and Cultus Lake districts was small, while an unusually heavy run—nearly five times as large as that of the preceding cycle year of 1917—occurred in the Birkenhead river. Quite a large number of sockeye, spring and coho salmon were seen on the spawning grounds of Shuswap lake and Thompson river, and more sockeye reached Stuart lake and its tributaries than in any year since 1913. The run of sockeye to the early spawning streams at the head of Owikano lake, Rivers inlet, was small, while the late streams generally were well stocked and some of them carried more salmon than they did since 1913. The best previous collection of eggs was exceeded by several millions. All the creeks and the more important spawning grounds of the Babine Lake district, with the exception of the lower Babine river, carried a good run of sockeye and were well seeded, while the run to the Lakelse lake was up to the average of the off years that occur in each cycle of four in this region. Sockeye were even more numerous in the Anderson Lake district than they were during the large run of last year, and the spawning grounds were heavily seeded. These spawning grounds were not damaged by the freshets to the same extent as were those in the lower portions of the Fraser and Skeena rivers, but there will undoubtedly be some loss of eggs and fry through receding water levels. The run to the Kennedy lake district was small and of short duration. It was somewhat similar to, although better than, the run of the preceding cycle year of 1917. This improvement was reflected in the seeding of the spawning grounds and the number of eggs collected. The run of spring and coho to the Cowichan lake district was heavy and in the opinion of some of the oldest residents was the largest they have ever seen. The unusual freshets in all the coast regions of British Columbia increased the cost and interfered to a large extent with the collection of eggs. They also did an enormous amount of damage to the spawning beds although the high water no doubt allowed a larger number of fish to escape from the commercial nets than would have been the case had normal conditions prevailed. These freshets did not extend to the Shuswap and Stuart lakes so that the spawning grounds of these regions were not damaged in that way.

The Highwood river and its tributaries were thoroughly inspected with a view to locating points where cutthroat eggs might be obtained for a small hatchery in that district. The ground was thoroughly covered, but trout were extremely scarce and nowhere found in sufficient numbers to warrant any expenditure in the way of a hatchery.

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The total collection of eggs of the different species made during 1921 was as follows:—

Atlantic salmon.. . . .	31,917,500
Ouananiche.. . . .	23,000
Cutthroat trout.. . . .	613,860
Steelhead salmon.. . . .	94,900
Kamloops trout.. . . .	460,000
Sockeye salmon.. . . .	79,930,550
Spring salmon.. . . .	2,444,300
Albino spring salmon.. . . .	9,000
Coho salmon.. . . .	1,314,750
Pink salmon.. . . .	4,911,000
Speckled trout.. . . .	560,000
Whitefish.. . . .	744,399,500
Salmon trout.. . . .	40,186,500
Pickerele.. . . .	215,728,000
	<hr/>
	1,122,592,860

In addition to the eggs collected, six hundred thousand rainbow trout eggs and nine hundred and eighty thousand speckled trout eggs were purchased from commercial firms; five hundred and seven thousand rainbow trout eggs, two hundred thousand cutthroat trout eggs, eight hundred thousand speckled trout eggs and eighty-five thousand brown trout eggs were received from Federal and State Departments of the United States in exchange for Atlantic salmon eggs.

Under an arrangement made with the Department of Game and Fisheries, concurred in by this department, the officers of the Federal hatchery at Cape Vincent, N.Y., collected whitefish and lake herring eggs in Canadian waters on the Ontario side of the boundary line. This department is indebted to the United States Bureau of Fisheries for a present of 28,215,000 whitefish from the surplus collection at the Cape Vincent hatchery. These eggs were placed in the Kingsville hatchery. It is also indebted to the Department of Game and Fisheries, Toronto, for 18,750,000 pickerel eggs that it collected in Hay bay, Bay of Quinte. These eggs were placed in the Thurlow hatchery and a portion of the resulting fry were placed at the disposal of the provincial department for stocking waters that are not as readily accessible from its own hatcheries. A surplus collection of 1,568,000 salmon trout eggs, included in the above statement, from this department's hatchery at Wiarton was turned over to the provincial hatchery at Sault Ste. Marie, Ont.

REARING OF FINGERLINGS

Greater attention was given to the rearing and feeding of fry, and the distribution of advanced fry and fingerlings was increased by one hundred and forty-two per cent., or from nine and a half to twenty-three millions. The existing ponds and tanks were extended at several hatcheries, and natural ponds in the shape of creek beds in which the water is readily controlled were utilized in all instances where suitable conditions of this nature were found within reasonable distance of the hatcheries.

The question of food is one of the greatest problems in the feeding of fry, particularly at the isolated hatcheries. Many kinds of food have been tried, prepared in different ways and fed in different rotations. Raw beef liver would appear to produce the best growth, but it is somewhat expensive and cannot be shipped in a frozen state to the remote hatcheries. Fishotein, a prepared food, is a good standby as it will keep almost indefinitely, but the fry soon tire of it and appear to sicken if fed on it for any length of time. The "ball" method of feeding canned salmon, which apparently originated with Superintendent Gibbs, of the Babine hatchery, has been followed with satisfactory results at several hatcheries in British Columbia. The salmon is properly ground and then made into small balls with a stone in the the centre to keep them from floating. The balls are placed in an egg-basket, the

sides of which have been cut down and lowered to within three or four inches of the bottom of the pond. There is very little waste and any residue is readily removed without fouling the ponds. The paddle wheel automatic feeder was very effective with canned and fresh fish, particularly at outlying ponds, as by filling them night and morning a steady supply of food is provided.

The success previously referred to that is to be met with from distributing fry in lakes that are barren of fish life and in which natural fish food is abundant was amply demonstrated during the past year. The necessary protection from other fish is provided and the cost of feeding is eliminated. The greater part of the sockeye fry distributed in Grace lake at the headwaters of Morris creek, near the Harrison lake hatchery, in April, 1920, left the lake during the following July and August when they had attained a length of three inches. Similarly sockeye fry placed in Hicks lake in June, 1920, migrated therefrom in May of the following year. The first to migrate were eight inches long and they gradually decreased to five inches as the migration progressed.

There are undoubtedly numerous lakes in the mountainous regions which meet the requirements up to a certain point, but they are not always conveniently accessible to the several hatcheries or the outlets are not always such as can be negotiated safely by the young fish when passing out on their way to salt water. In some cases an impassable fall will prevent the safe descent of fry and unless some reasonably inexpensive means can be devised for the safe passage, such lakes can be of no use for the purpose required. At certain points it is convenient to transfer young fry from the hatcheries, but at others it is necessary, on account of the distances and other difficulties of transportation, to use eyed eggs by either planting them in the gravel in the inlets or in temporary hatching troughs. This inexpensive and efficient system is being developed at all points accessible from the hatchery where the desired conditions are found to the fullest possible extent.

EQUIPMENT

A highly efficient box by means of which eyed eggs can be planted in suitable localities under water, in such manner as to insure all of them being at a suitable depth below the level of the stream bottom, was perfected by the District Inspector of Hatcheries for British Columbia. With this box the eggs can be planted in quite rapid water, which is so often found on the spawning beds of the salmon. This box facilitates the stocking of suitable areas to which it is not feasible to convey fry from the hatcheries; it facilitates the stocking of sparsely seeded areas with eggs from heavily or over-seeded streams, and it permits such plantings being made with eyed eggs that are 100 per cent fertilized after the freshet season, which guards against the destruction of the ova by the scouring out of the stream beds, receding waters; ducks, gulls and other natural enemies. Certain tributaries of the Upper Fraser and other isolated waters have been stocked in this way.

A graduated whitefish hatching jar has also been perfected, and it will take the place of the present jars as replacements are necessary. The graduations are of the greatest convenience in calculating the egg contents of the hatcheries at any time. This improvement was first suggested by the District Inspector of Hatcheries for the eastern division. The superintendent of the Pemberton hatchery experimented rather fully in handling green sockeye eggs in different ways, and is of the opinion that the loss is smallest when the eggs are transferred and laid down in the troughs while they are still in a soft state and before they are water-hardened. His conclusions are in line with those arrived at by the superintendent of Harrison lake, in the tests made by him some years ago at Cultus lake. This method is apparently limited in its application as it has been found successful only with eggs that can be placed in the hatchery troughs shortly after they are taken.

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An experiment was carried out with a view to finding out the result of the vibration of a seaplane on eyed eggs when they are being transported from one point to another. Two thousand each of both the sockeye and pink varieties were taken from the Harrison Lake hatchery and carried for forty-five minutes in the air at an altitude of five thousand feet. They were later carefully placed by themselves in the hatchery troughs and their condition closely observed. The several subsequent reports from the superintendent of the hatchery show that absolutely no injury resulted.

This experiment is interesting in view of the possible use of seaplanes for the purpose of stocking otherwise inaccessible portions of the Fraser River watershed or other localities. The one objection to this method, however, is the probable high cost in connection with the operation of the air service which may possibly make it prohibitive in so far as fish cultural operations are concerned.

ACCLIMATIZATION

In response to a largely signed petition from the anglers and residents of the St. John district, supported by the civic bodies and others, the department agreed to make a systematic attempt to establish the European or Brown trout in Loch Lomond, near St. John. The petitioners were fully advised with regard to the possibility of the Brown exterminating the native speckled trout, but they were strongly in favour of obtaining the larger fish, particularly as it is a surface feeder and furnishes better sport during the summer months. Loch Lomond is well adapted for such an experiment as it is a comparatively small and self-contained system and not connected with any large watershed. Brown trout eggs are not easily obtained, and the initial shipment of eighty-five thousand were procured through the courtesy of the United States Bureau of Fisheries in exchange for Atlantic salmon eggs.

MARKING OF FISH

The marking of fingerling and adult fish was continued on a larger scale than in any previous year, the object being to obtain some definite information as regards the frequency in spawning; the constancy in regard to the dates at which the same salmon ascends the rivers from the sea; the percentage of well mended kelt that return; the percentage of artificially fed fry that return as salmon; if rapid growth has any effect on the return of salmon fry, and the extent to which sockeye enter the Fraser river after the regular fishing season. Adult salmon were marked by a numbered silver tag attached to their dorsal fin, and the fingerlings in most instances by the removal of the adipose fin.

The recapture of 152 Atlantic salmon that were marked and liberated after they were stripped at the different retaining ponds has been reported to the department. Forty-eight were recaptured before they had left the river and 104 after their return from the sea, as clean fish. The salmon for most of the retaining ponds are purchased from the commercial fishermen. These fish are all caught in the first instance and also recaptured by anglers and commercial fishermen during the spring and early summer. In the Miramichi and Margaree rivers the salmon for hatchery purposes are caught in nets operated for that purpose only. These nets begin fishing on or about September 15 and August 25 respectively. The recapture of sixty-two clean salmon that were marked and liberated in these two rivers have been reported. They were all in the first instance caught after August 25. Forty-seven, or over seventy-five per cent, were recaptured in the spring and early summer, all before August 16, and only fifteen, or less than twenty-five per cent, after that date. These returns, although limited, are definite in character and indicate that heredity is not the predominating influence as regards the time that salmon ascend the rivers from the sea, and that a salmon that ascends late in the season any year is liable to be an early fish on its return from the sea.

RELATIONS WITH OTHER GOVERNMENTS

Closer co-operation now prevails than ever before between the department and the provincial officials in fish cultural matters. The most cordial relations exist between the department, the United States Bureau of Fisheries and the provinces in contiguous waters where the different services co-operate for the mutual benefit of all concerned. The assistance and co-operation of the lessees of angling rights is also acknowledged; particularly the Restigouche Riparian Association, which for several years has placed its launch, free of any charge, at the disposal of the department for towing parent salmon for the New Mills salmon pond, N.B., and the lessees of the York and Barachois rivers, Gaspé, Que., in whose waters the salmon eggs for the Gaspé hatchery were collected.

No new establishments were built during the year but numerous expansions, repairs and replacements were made at the different hatcheries, and they are all fully equipped and in a reasonably good state of repair.

On the night of October 28-29, owing to unusually violent freshets, both of the water mains which supply the city of New Westminster were broken and considerable portions carried completely away. As the new Westminster hatchery is dependent upon the city supply, operations had to be discontinued until the water system is permanently repaired, which it is anticipated will not be until about May, 1922.

In recent seasons, the collection of eggs for the Gerrard hatchery has been disappointing owing undoubtedly to the series of dense log and brush jams which have formed in the Lardeau river. These obstructions are huge, and the expense which would be involved in their removal would amount to many thousands of dollars. It was felt that the results which could reasonably be expected from the maintenance of a fully equipped hatchery would not be commensurate with the heavy expense involved in removing the afore-mentioned obstructions, and it was, therefore, decided to use the hatchery buildings as an eyeing station only, and, after planting a fair proportion of the collection in the streams from which the eggs were taken, to distribute the balance in other desirable lakes and streams.

A summer school for hatchery officers in the Maritime Provinces and Quebec was held at Truro, N.S., from August 2 to 19, 1921. The course of study was arranged by the Biological Board, and the school was conducted under the personal direction of the board's chairman, Dr. A. P. Knight, until recently of Queens University. The subjects taken up were the physical and chemical properties of air and water, and the structure and functions of some typical animals and plants in relation to hatchery problems.

The staff, without exception, was most conscientious, faithful and unsparing of personal effort in the discharge of their duties. The well merited appointment of Mr. C. W. Harrison, as District Inspector of Hatcheries for British Columbia, will enable the question of needed expansion in the province to be taken up in a more vigorous manner than has hitherto been possible.

Most regrettable and unfortunate losses occurred in the death by drowning during the freshets of Mr. T. H. H. Guegan at the Lakelse Lake hatchery, and Mr. H. Ross at the Pemberton hatchery, B.C.

Thirty-four main hatcheries, twelve subsidiary hatcheries, six salmon retaining ponds and a large number of egg-collecting camps were operated. The total distribution of all species was ninety-five and a half millions larger than it was last year and several lakes in the Western Provinces that are not readily accessible from a hatchery were stocked by the transfer to them of fish from other waters.

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The total distribution of eggs and fish by species and by provinces during 1921 was, as follows:—

Nova Scotia—		
Atlantic salmon..	6,427,500	
Rainbow trout..	89,500	
Speckled trout..	416,400	
		6,933,400
New Brunswick—		
Atlantic salmon..	9,232,715	
Spring salmon..	236,825	
Speckled trout..	189,444	
Brown trout..	23,057	
		9,732,041
Prince Edward Island—		
Atlantic salmon..	871,946	
Speckled trout..	292,422	
		1,164,368
Quebec—		
Atlantic salmon	4,177,809	
Ouananiche	12,705	
Speckled trout..	26,679	
		4,217,193
Ontario—		
Spring salmon..	125,350	
Whitefish	268,103,500	
Salmon trout..	17,945,702	
Herring..	5,620,000	
Pickarel..	124,097,000	
		415,891,552
Manitoba—		
Whitefish	233,842,300	
Pickarel..	41,528,000	
		275,370,300
Saskatchewan—		
Whitefish..	20,575,000	
		20,575,000
Alberta—		
Atlantic salmon..	133,600	
Ouananiche..	1,218	
Rainbow trout..	649,752	
Cutthroat trout..	379,550	
Salmon trout..	136,756	
		1,300,876
British Columbia—		
Atlantic salmon..	277,641	
Cutthroat trout..	61,216	
Steelhead salmon..	81,877	
Kamloops trout..	417,769	
Sockeye salmon..	84,789,624	
Albino spring salmon..	76	
Spring salmon..	3,513,387	
Coho salmon..	3,476,811	
Pink salmon..	250,000	
Chum salmon..	5,380,000	
Speckled trout..	48,520	
Whitefish..	12,375,000	
		110,671,921
Total distribution..		845,856,651

FISHWAYS

In accordance with the policy adopted last year, monthly reports of the conditions of all fishways within their districts have been received this year from the fishery overseers. This has enabled the department to keep in closer touch with this class of work and to take steps where such are required to have defects remedied from time to time.

In addition to the reports above stated, the departmental engineer made an inspection of a number of dams requiring new fishways or repairs to the existing ones, and secured data for the preparation of plans from which they could be constructed.

In several instances where the owners of dams had complied with the regulations regarding fishways, the department undertook the construction of new ones.

The following is a list of dams inspected by the engineer in the Maritime Provinces last year:—

Tusket River—Yarmouth County, N.S.—

- (a) Yarmouth Light and Power Company, Limited, power dam.
- (b) Yarmouth Light and Power Company, Limited, storage dam.

Herring Brook—Yarmouth County, N.S.—

- (a) Babine and Porthier's dam.

Clyde River—Shelburne County, N.S.—

- (a) Clyde Pulp Co. storage dam at Queens.
- (b) Clyde Pulp Co. pulp-mill dam.
- (c) Sutherland Lumber Co. saw-mill dam.

Black Brook—Shelburne County, N.S.—

- Canadian National Railway dam.

Mersey River—Queens County, N.S.

- (a) Minard's dam at Milton.
- (b) Harlow and Kempton's dam
- (c) Pulp-mill lower dam.
- (d) Pulp-mill upper dam.

Medway River—Queen's County, N.S.—

- (a) Pulp-mill dam at Charleston.
- (b) Salter's Falls.

Petite Riviere—Lunenburg County, N.S.—

- (a) G. B. Crouse dam.
- (b) Alfred Kaulback dam.
- (c) Henry Kaulback dam, Conquerall Mills.

Lahave River—Lunenburg County, N.S.—

- (a) Davison Lumber Co. lower dam.
- (b) Davison Lumber Co. upper dam.
- (c) W. E. Parnell, pulp-mill dam.
- (d) Ed. Zwicker and Sons, mill dam.

Mush-a-mush River—Lunenburg County, N.S.—

- (a) Nova Scotia Power Commission power dam.
- (b) Edwards Ernst dam.
- (c) Robar's dam.
- (d) Nova Scotia Power Commission storage dam at foot of Little Mush-a-mush Lake.
- (e) Nova Scotia Power Commission storage dam at foot of Big Mush-a-mush Lake.

* *Sackville River*—Halifax County, N.S.—

- (a) Sackville Electric Light Co. dam at Bedford.

Nine Mile River—Halifax County, N.S.—

- (a) Blanchard and McCurdy dam.

Musquodoboit River—Halifax County, N.S.—

- (a) Abandoned dam at Musquodoboit Harbour.

Sheet Harbour River—Halifax County, N.S.—

- (a) Sheet Harbour Lumber Co. dam (west branch).

Rights River—Antigonish County, N.S.—

- (a) Vintens dam at Sylvan Valley.

Lequille River—Annapolis County, N.S.—

- (a) Town of Annapolis. Power dam.
- (b) Town of Annapolis. Storage dam.

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Annapolis River.—Annapolis County, N.S.—

(a) Town of Lawrencetown power dam.

Gaspereaux River.—King's County, N.S.—

(a) Wright and Joudry power dam.

Kouchibouguac River.—Kent County, N.B.—

(a) Camerons Mill dam.

Kouchibouguac River.—Kent County, N.B.—

(a) Town of Richibucto power dam.

Nashwaak River.—York County, N.B.—

(a) Nashwaak Pulp & Paper Co., dam.

Pokiok River.—York County, N.B.—

(a) Dam at the foot of lake George.

In some instances inspections of dams were for the purpose of obtaining data for the preparation of designs for fishways, while in others it was desirable to ascertain if fishways previously constructed were effective.

The department undertook the construction of the following works during the year the owners in the case of fishways having complied with the regulations:—

Tusket River.—Fishway in the Yarmouth Light and Power Company Hydro-Electric power dam.

Mersey River.—Fishway in Minard's dam at Milton. Repairs to fishway in Harlow and Kempton dam. Alterations to fishway in pulp mill lower dam. Completion of fishway in pulp mill upper dam.

Medway River.—Cleaning out channel and construction of wing dams through Salters falls to assist in the ascent of salmon during low water.

Lequille River.—Construction of additional partitions in the Annapolis Hydro-Electric power dam fishway.

Nashwaak River.—Slight alterations to the foot of the fishway in the Nashwaak Pulp and Paper Company dam.

The following fishways were constructed during the year by the owners of dams from plans furnished by the department:—

Clyde River.—Fishway in Clyde Pulp Company dam at Queens.

Mush-a-mush River.—Fishway in storage dam at foot of Little Mush-a-mush lake.

Fishway in storage dam at foot of Big Mush-a-mush lake.

Gaspereaux River.—Alterations to fishway at Wright and Joudry dam to meet conditions created by extension to power plant.

Apple River.—Construction of fishway in C. H. White & Son dam.

Lequille River.—Construction of fishway in dam owned by H. Harnish.

Lahave River.—Construction of fishway in second dam at Bridgewater.

Pokiok River.—Construction of fishway in dam at foot of lake George.

Kouchibouguac River.—Alterations to fishway in dam owned by the town of Richibucto.

A large number of dams throughout the Maritime provinces form problems in the construction of fishways which are difficult to overcome, owing to the fact that many of them are on small streams, where, during the greater part of the season, the volume of flow is quite small. Operation of the power plant in such dams usually drains the water down to such an extent that the fishway becomes dry. On the whole, however, progress is being made. In the case of the Mersey river, which has been obstructed for a number of years, reliable reports indicate that the construction of fishways resulted in numbers of salmon ascending.

Conditions on the Medway river are also reported to be much improved this year, as a result of the work done, and an agreement with the Pulp Company regarding the periodical operation of the mill during low water.

The fishway in the dam on the Gaspereaux river has proved quite satisfactory, both salmon and alewives having been seen to ascend it in numbers.

In British Columbia the work in this connection is confined principally to the removal of obstructions to the ascent of salmon. The principal works undertaken were as follows:—

Granite and Scullabuchan Creeks.—Both of these streams flow into Lakelse lake, which in the past has been a favourable spawning area for salmon of the sockeye species. The removal of accumulated debris resulted in the flow of water passing along the old channels and has restored considerable spawning area.

Atnarko River.—The work done during the year comprised a completion of removal of obstructions on the Bella Coola and Atnarko rivers. Natural conditions are now restored and large spawning areas opened up again to ascending salmon.

Mink Trap Bay.—The operations at this point necessitated the use of heavy machinery as the accumulated debris completely blocked the entrance of the stream. The obstruction was satisfactorily removed and reports show that as a result, spawning sockeye salmon reached the lake above.

Markwell River.—The Markwell river, although not a salmon stream, has been diverted from its main channel and was wearing away the bank which separated it from the very valuable spawning area of Genesi creek, and had it been successful would have completely ruined the sockeye grounds. By the removal of a log jam and the excavation of a channel some 300 feet long, the stream was permitted to flow down the old channel and the necessary protection to Genesi creek assured.

Fishermans River.—This river was cleaned of log jams for a distance of $3\frac{1}{2}$ miles from its mouth and it is anticipated that ascending fish will have no difficulty in reaching the spawning grounds.

Salmon River.—At Salmon river the work consisted of the removal of a large portion of a log jam about one mile from Shuswap lake and cutting of a channel 30 feet wide through the remainder of the jam. The Shuswap lake area at one time teemed with sockeye salmon and at the present time efforts are being made by the way of fish culture to restore this run, and by clearing out obstructions in the streams to permit the return of parent fish for natural spawning.

Skutz Falls, Cowichan River.—In the case of the Cowichan river at Skutz falls, it was necessary to widen the channel and construct a series of concrete steps to assist the passage of salmon. The work accomplished this year has resulted in the fish being able to ascend without difficulty.

In addition to the above numerous other points received attention to a more limited extent.

In the three Prairie Provinces the work in connection with fishways consisted principally of inspections by the officers to see that the structures were kept in good condition and open to the ascent of fish.

Considerable difficulty was experienced at the Canadian Pacific Railway irrigation canal at East Calgary, where the closing of the head gates resulted in immense numbers of fish being stranded.

The establishment of screens to prevent the entry of fish into the canal was looked into and found to be practically impossible.

By an arrangement with the company in which it agreed that the head gates should be closed very gradually, the greater number of fish in the canal ascended to the main river before the water became too low and by allowing a very small run to continue throughout the winter those which remained were found to have passed the winter without loss.

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BIOLOGICAL STATIONS OF CANADA.

The work of the two Biological Stations was much extended during the year 1921-22, and embraced more than a dozen distinct schemes of investigation. These may be summarized as follows:—

1. Laboratory researches carried on by a staff of twenty-five university professors, assistants and advanced researchers. For a year's investigations the specially equipped tables, scientific instruments and other facilities of the two stations were fully utilized.

2. Investigations carried on in various ways, more or less distant from the stations, included the continued oyster culture experiments and studies on the Prince Edward Island oyster beds, Shad Investigations in Cobequid bay, and the adjacent rivers and streams and other lines of work, also Smelt and Flounder spawning Investigations in various localities, etc.

3. Inshore and offshore (deep-sea) researches carried on by the staff on board the Biological vessel *Prince* on the Atlantic coast and by the Biological vessel *Ordonez* on the Pacific coast.

4. A scheme of studies at curing stations and canneries with special reference to dried and canned fish and the "blackening" of lobsters and the "reddening" of salted cod.

5. Further lobster studies, especially the experimental study of larval lobsters at St. Andrews and at Summerside, P.E.I.

6. Tidal pool studies and inshore work on the conditions of fish life in Passamaquoddy bay and on the Vancouver island shore.

7. Further water researches in the Great Lakes, particularly the study of the lake herring in the waters of lake Erie.

8. Courses of instruction on the best conditions for lobster canning and addresses on the causes of spoilt canned lobsters. This work was carried on under Dr. Knight's superintendence, mainly on Prince Edward Island, and included addresses by Dr. Knight and Dr. Prince to the inspectors and fishermen at their conference in Charlottetown.

9. Collections of fishery and other marine material during the winter and summer months, weekly and monthly and special plankton and hydrographic work all the year around by the cruises of the *Prince*.

10. Similar field investigations were carried on from the British Columbia Station, and water samples, temperature observations and other work was done in the waters north and south of the station including dredging trips up to Lasqueti island and as far south as Thetis island, and work at the mouth of the Fraser river.

11. Bottom and surface studies of the biology and conditions of Kennebecasis waters, St. John river, N.B.

12. The preparation and publication of a series of reports of fisheries, etc., under the editorship of Professor J. P. McMurrich, these being a continuation of the "Contributions to Canadian Biology" (new series).

13. The station also, through its staff, gave assistance in the scheme of international fisheries investigations and will during the coming seasons take an important part in this work.

INTERNATIONAL WORK

In addition to the lines of opportunity pertaining to the operations of the stations proper, the board has in various ways aided in the completion of an international scheme of investigations, and prepared a plan of work in which the services of the board's vessel *Prince* would be utilized. The study of the mackerel migrations on the Atlantic coast are specially included in this work. Dr. Huntsman and Professor McMurrich have been named as members of the Joint International Committee and their services have been enlisted in co-operation with eminent United States scientists appointed by the federal authorities, Washington, D.C.

BUILDING EXTENSIONS

Both stations have been much inconvenienced by shortage of laboratory accommodation and boarding facilities for workers owing to the increasing number of qualified workers who have made application for permission to conduct fishery and marine investigations under the board. The necessity of extending the Pacific Station has been forced upon the board for several years, and plans had been completed for the erection of new additions to the station near Nanaimo, B.C., but in view of the limited appropriation it was not possible to proceed with the work. The larger vote generously granted by Parliament will now make feasible these extensions of the premises at Departure Bay, which include a new chemical room, balance room and museum accommodation, the latter being in the lower portion of the proposed extension, while an electric lighting system replaces the existing dangerous mode of illumination hitherto adopted. At St. Andrews the laboratory accommodation has been largely increased by the addition of a large terminal wing added on the west end of the old building and by a new library apartment and a well equipped bacteriological and biochemical laboratory. The much needed extension of the residence was also planned by the board, but could not be carried out owing to lack of funds. Rearrangement of the rooming and dining accommodation carried out by Dr. Huntsman has, however, provided for a largely increased staff of scientists. The increasing number of trained workers resorting each season to the stations may render it necessary to carry out completely the extensions planned. A very important addition to the equipment at St. Andrews is the new up-to-date refrigeration operations for experiments with frozen fish and other important products. Additions to the scientific appliances have been made from time to time and the two Biological vessels *Prince* and *Ordonez* have been repaired and have been employed in carrying out towing and other biological and physical work already referred to.

PROBLEMS INVESTIGATED

The two stations which at one time confined their work mainly to the summer months have now been able to arrange for continuous work all the year around, though the main researches of the staff are carried on from early in June to the end of September.

Among the workers and their problems during the past year have been:—

Dr. A. P. Knight, Chairman of the Board: "Lobster Rearing and Bacteriology of the Canning Industry."

Dr. E. E. Prince: "Studies of Temperature and Light in rearing Larval Lobsters, as well as other fishery studies."

Professor L. W. Bailey: "Canadian Diatoms of the Atlantic and of Northern Waters."

Professor E. M. Harvey, Princeville, N.S.: "Bioluminescence in Marine Animals."

Principal Harrison McDonald: "Bacteriology of Canned and Dried Fish, also 'red' cured cod."

Miss M. E. Kennedy, Macdonald: "Studies on reddened salt cod."

Professor C. J. Connelly, St. Francis Xavier: "Young stages of crab, shrimp, etc."

Dr. A. G. Huntsman: "Factors influencing Reproduction and Growth of Marine Forms."

Dr. S. J. Jackson, McGill: "Histology of Frozen Fish Tissues."

Professor A. B. Klugh, Queens: "Culture of Copepod, Ostracod and other Aquatic forms."

Mr. A. H. Liem, Toronto: "H-Ion concentration in relation to copepod life, also had fishery researches."

Miss Pallon, Manitoba: "Chemistry of Fish Muscle Stroma."

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Miss D. E. Newton, Macdonald: "Spore forming Bacteria."

Miss M. E. Reid, Toronto: "Spawning of Sea Perch."

Miss E. M. Taylor, Toronto: "H-Ion concentration as affecting Marine Animals."

Miss A. E. Dempsey, Toronto: "Chemistry of Fish Muscle Juice."

Miss F. Fraser, Toronto: "Effect of Light on Growth of Inter-tidal animals."

Among those conducting researches in localities more or less distant from the station:—

Professor P. Cox, Fredericton: "Biology of S. W. Nova Scotian Waters."

Miss M. S. Sparks, Toronto: "Fish Studies off Nova Scotia Coast."

Professor A. D. Robertson; Western, London; Miss Battle and Miss McIntosh: "Further Oyster Investigations, Prince Edward Island."

Mr. A. H. Leim: "Shad Studies at the head of the Bay of Fundy."

The Pacific Station has a similar full record of work carried on including:—

Professor McLean Fraser, Vancouver: "Food of British Columbia Fish, study of Hydroids, etc."

Professor C. H. O'Donoghue, Manitoba: "Taxonomy and other Studies."

Professor A. T. Cameron, Winnipeg: "Causes of variation in sea water, composition, iodine in Annelid, etc., also joining with Professor O'Donoghue, "Light Reactions on free swimming Animals influenced by drugs."

Miss Mounce, Winnipeg: "Variation in distribution of diatoms due to water conditions, also distribution of algae in selected areas, etc."

Mr. H. A. Dunlop, Vancouver: "Distribution of free-swimming copepods."

Mr. R. E. Foerster, Vancouver: "Systematic Study of Medusae."

It may be added that the laboratories at each station have received important additions during the year and that the addition of a collector of material (Captain Rigby) has been of great assistance, and under the direction of Dr. Huntsman at St. Andrews, who has been responsible in carrying out the elaborate problem undertaken for the past season at St. Andrews, and under the superintendence of Dr. McLean Fraser, who directed the varied activities at the Pacific Station, most successful fishery and other researches have been completed. Professor Fraser agreed to the board's proposal to continue as Director of the British Columbia Station after his appointment as Professor of Zoology in the University of British Columbia, and he has arranged as regularly as possible to visit the station and to spend all the available time possible in carrying on the work there. The two stations under their able directors are accomplishing a greater amount of valuable work than has been possible during the previous years of the operations of these valuable Government institutions.

NATURAL HISTORY OBSERVATIONS

During the summer and fall of 1921, Mr. Andrew Halkett, the department's naturalist, carried on observations as to the condition of the lobsters in the counties of Queens and Shelburne, N.S., on the Northumberland strait shore, and at the Magdalen islands. Much useful data concerning the condition, size, and sex of the lobsters taken, and the depth and temperature of the water from which they were taken, has been obtained, tabulated and filed. Observations of the condition of the scallop and scallop beds of Mahone bay, N.S., were continued during the month of June.

Meetings were also held by the naturalist during January, February and March of the present year at places along the shore of Westmoreland, Kent, Northumberland and Gloucester counties, N.B. The meetings took the form of talks to fishermen, followed by discussions on the importance of preserving seed lobsters, the spawning and moulting habits of the lobster, and kindred subjects. In addition thereto, the subject of bacteria and their effect on canned lobster meat was touched on, and a number of lantern slides, showing the various kinds of germs, were utilized in illustrating their growth.

INTERNATIONAL EFFORTS TO REPLENISH THE FRASER RIVER

Owing to the sockeye fishery of the Fraser river and its approaches having become so seriously depleted as to reduce the annual pack to a very small fraction of that of past years, efforts have in recent years been made to find a means of restoring the former condition of this fishery. Owing to the fact that the salmon making for the Fraser river pass through the waters of Puget sound, on the United States side of the line, it is useless to put into force any regulations curtailing fishing operations on the Canadian side, unless similar steps are taken on the American side of the line. Many meetings have been held by the authorities, or by representatives of the two Governments concerned, with a view to arranging for some co-operative action, in order to preserve the valuable sockeye run to the Fraser. Up to the moment, it has not been possible to secure such co-operation. It was hoped that the draft treaty recommended by the Canadian American Commission, of 1918, would have provided a means of dealing satisfactorily with the situation. Unfortunately, the United States Senate threw out the treaty as a result of opposition to it from the State of Washington.

When it became apparent that no help could be expected from the proposed treaty, steps were taken to arrange a meeting between representatives of this department and the newly appointed State of Washington Fisheries Board, with a view to reaching some understanding on the question of restoring the sockeye run to the Fraser river.

A meeting was held in Vancouver on December 12 last, the following being present to represent Canadian interests: W. A. Found, Major J. A. Motherwell, Dr. C. McLean Fraser, F. Harrison, John P. Babcock.

The representatives of the State of Washington present were: E. A. Sims, H. Ramwell, E. P. Blake, E. A. Seaborg, L. H. Darwin.

The following subjects were placed before the meeting for consideration:—

1. Perpetuation of the sockeye salmon common to the Fraser river system, the other waters of the Gulf of Georgia and its tributaries and of the Strait of Juan de Fuca and Puget sound.
2. Protection of the salmon of the coastal waters of Vancouver island and the State of Washington.
3. To increase the pink salmon in the waters mentioned in section 1 and also of Puget sound wherein pinks contribute to the supply in such contiguous waters.
4. That the pink run be built up in the even numbered years.
5. That where salmon runs have been depleted, salmon eggs or fry be imported from such places as they can be procured for re-stocking.
6. Regulation of seasons in British Columbia and Puget sound.
7. The maintenance and operation of such international hatcheries as are necessary for reproduction of salmon.

No agreement was reached on measures to be taken for the restoration of the sockeye salmon run to Puget sound and the Fraser river. Both sides agreed that if the sockeye run is to be restored there must be a complete stoppage of fishing for at least five years. The Canadian authorities agreed to this only on condition that at the end of the five-year period, when fishing is resumed, the use of purse-seines for the capture of sockeye must be prohibited and the use of fish traps and gill-nets properly regulated.

Canadian representatives expressed the opinion that the sacrifice involved in the total cessation of fishing for five years would not be worth enduring if at the end of that time the use of these appliances were permitted as at present.

The Washington State representatives took the ground that it would be unwise for them to make an agreement which would tie the hands of those who might be in authority and dealing with state fishing matters five years hence; that as the situation

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is one calling for immediate action, no consideration as to what might take place six or seven years afterwards should be allowed to interfere with the taking of the necessary measures to restore the sockeye run.

Tentative agreements were reached on several of the other questions which came before the meeting. These include:

1. Protection of immature salmon in the coastal waters of the west coast of Vancouver island and the Washington shore.

2. Investigations to ascertain the desirability of prohibiting fishing inside the three-mile limit off Vancouver island and the coast of Washington.

3. Proposal to establish humpback runs during the even numbered years in Puget sound and Fraser river waters similar to those in the odd numbered years and the bringing of eggs from other points in British Columbia and Alaska to effect this.

4. A general biological survey of the waters of the Fraser river and the adjacent Washington areas to ascertain the possible extent to which salmon may be propagated in that system.

5. To hold another conference later on for the purpose of regulating humpback fishing to permit of a sufficient escapement of this variety of fish to the hatchery streams and natural spawning grounds.

In closing this report I much regret to say that the prosecution of our fisheries during the year under review was accompanied by the usual loss of life. In each month of the main fishing season from one to eight fishermen were drowned on the Atlantic side. Altogether twenty-five lives were lost, twenty on the Atlantic and five on the Pacific.

I am, sir, your obedient servant,

A. JOHNSTON,

Deputy Minister of Marine and Fisheries.

APPENDIX I.

REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR, WARD FISHER, ATLANTIC FISHERIES
DIVISION, 1921

The past year was, without doubt, the most unusual and trying season experienced in the Canadian Atlantic fisheries for the past forty years.

Production was greatly curtailed, particularly during the first eight months, due largely to the low prices prevailing for catches. In many districts operations were almost wholly suspended, and the fishermen, whenever possible, engaged in other occupations. Dealers ceased buying. The prices for the small catches secured were exceptionally low, ranging from 80 cents per cwt. for fresh haddock to \$1.25 for fresh cod. These prices were unprofitable to the fishermen, and in some instances not sufficient to pay operating expenses.

The general marketing conditions for fish products were unfavourable, and made impossible any large or steady buying on the part of its dealers, whose efforts were chiefly confined to disposing of the supplies left over from the preceding year. The markets very considerably improved the past four months, and the stocks on hand absorbed, with the prospect that the coming year will see a resumption of the activities both from a producing and export point of view.

The untoward conditions above referred to, together with a lack of employment in other industries, caused considerable hardship to the fishermen of many districts.

Fortunately, the past few months there has been a gratifying improvement, and ready markets were found for the catches of all varieties of fish. Indeed, some of the principal dealers in fresh fish had difficulty in securing suitable supplies to fill orders for Quebec and Ontario markets.

The following review may be found of interest and value:—

NOVA SCOTIA

In this province, Halifax and Guysboro county and the island of Cape Breton were hard hit by the lack of market activities and the consequent low prices for the catches, with the result that the landings of the hand-line fishermen were small. To add to the general embarrassment, the usual run of spring and summer herring failed, the catches not being sufficient to furnish a satisfactory supply of bait. Shelburne and Queens were the most favourably situated during the summer season, as the buyers at Liverpool, Lockeport and Shelburne were paying as high as \$4.50 for market cod. Some of the fishermen in these districts had a successful season.

The lobster fishery was the one bright spot, particularly in western Shelburne, Yarmouth and Digby. The regular season of three months from March 1 was the most profitable in the history of the industry. The weather was uniformly good, in some instances the fishermen hauled their traps regularly every day throughout the season. The catches were large, and of good quality. While the prices for "shorts" were only one-third that of the preceding year, the increased catches and fair prices received for live shipments more than equalized the low prices for the small lobsters. The district east of Baccaro, Shelburne county, to Guysboro, and also Cape Breton island, was not as advantageously situated, as the prevailing winds which obtained in Shelburne, Yarmouth and Digby were unsuited for the best results in the eastern district.

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District No. 1, Cape Breton.

The general conditions in this district were the most unsatisfactory in the history of the industry for many years. While fish of all kinds were plentiful, the low prices and poor market conditions prevailing throughout the whole season prevented operations being carried on with any degree of profitable zeal.

The lobster fishery was particularly disappointing, the catch being only 36,215 cwt., which shows a decrease in the catch of 19,675 cwt., as compared with 1920. The chief cause affecting this fishery was the low prices paid to the fishermen, which were less than one-half those prevailing in 1920. This resulted in many of the fishermen operating only a portion of the season and in a half-hearted way, as the cost of operations made reasonable, profits impossible. Forty-nine canneries were in operation, or five less than in 1920.

The herring catch shows a decrease of 3,116 cwt. as compared with the preceding year. The decrease is attributed to the scarcity of herring on the Inverness coast. Herring was very plentiful on the Richmond county coast but as the prices were unusually low and the cost of salt and barrels high, the fishermen did not prosecute this industry with much zeal.

The haddock catch shows a decrease of 42,569 cwt. compared with 1920.

The mackerel catch shows a decrease of 10,260 cwt. as compared with the preceding year. In Inverness there was a decrease as the mackerel only struck the coast off Inverness harbour. Isle Madame, Richmond county, shows a decrease of 7,913 cwt., while L'Ardoise shows an increase in the catch of 3,366 cwt. The catches were disposed of at good prices and the expense of curing was less than in 1920. The increase in the catch at L'Ardoise was due to favourable weather conditions which brought the fish more inshore and gave the poorer class of fishermen who were not equipped with motor boats, a good opportunity to operate.

The smelt fishery shows a marked increase in the catch, the quantity being 2,194 cwt., as compared with 571 cwt. for 1920. The prevailing price, however, was only \$3 per cwt.

The oyster fishery shows a substantial increase, the catch being 1,195 barrels as compared with 725 barrels the preceding year.

District No. 2, Nova Scotia East.

The industry was carried on with a comparatively fair measure of success. The weather conditions throughout the year being good, the fishermen were able to carry on operations without undue loss of gear.

The lobster catch was 48,428 cwt., which shows a decrease in the catch of 12,625 cwt. It should be noted that the average price for the catch in 1920 was 10 cents per pound, while in 1921 the average price was only about 5 cents per pound. With the exception of 1918 the catch was the smallest for over ten years.

The decrease in the catch was general throughout the district except in Cumberland county, where there was an increase of over 100 per cent in the catch and pack during the regular fall season, from August 16 to October 15. The spring catch in that county shows a considerable decline due to four canneries being closed. Halifax county west shows a slight increase, accounted for by the special fall season.

The explanations of the decrease are scarcity of fish and low prices. Three hundred and eighty-four more lobster fishing licenses were issued than in 1920, and of 63 cannery licenses issued 58 operated, but in Antigonish county, where 10 canneries were operating at the first of the season, only four continued up to June 1, and at the end of the season only two were operating. Scarcity of bait was noted especially in Pictou and Antigonish counties. All along the shore traps were taken ashore before the season closed, and on the whole the spring seasons in this district were not successful.

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The regular fall season, Cumberland county, was very successful and both packers and fishermen did very well—3,857 cwt. was the fresh catch compared with 1,771 cwt. in 1920; the pack was 1,815 cases compared with 881 cases. The market for canned lobsters improved towards the end of the year, and some packers obtained as high as \$30 per case.

One noticeable feature in fall packing was the high average quantity of lobster required to produce a case of 48 pounds of the canned product. This is due to the lobster being poorly meated after moulting, and the new shell not being hardened or filled out. In some cases as much as 235 pounds of fish was required to pack a 48-pound case.

The pack by counties was as follows:—

Cumberland.. . . .	4,379
Pictou.. . . .	7,707
Antigonish.. . . .	3,545
Guysboro.. . . .	3,895
Halifax.. . . .	1,346
	<hr/>
	20,872
Tomalley.. . . .	554
	<hr/>
	21,426

The catch of cod shows a general increase about 20 per cent greater than in 1920, with a decrease in value. The average price for 1920 was \$2.17 per cwt., while for 1921 it was only \$1.51 per cwt. Owing to steam trawlers operating from Halifax landing their catches at Portland, Me., the catch for Halifax shows a decrease in haddock, hake and cusk. The shore fishermen in Halifax, however, had an increased catch.

The haddock catch shows a decrease of 31,030 cwt. The decrease in the catch was in Halifax and Guysboro counties, the catch on Northumberland straits and the Bay of Fundy being about equal to that of 1920.

The herring catches have been decreasing in this district since 1918, the catch for the past year showing a decrease of 4,946 cwt. as compared with the preceding year. The decrease in Cumberland and Pictou counties, in the Northumberland straits district, was about 8,000 cwt. Guysboro shows an increase of 9,793 cwt., while Halifax shows a decrease of 7,446 cwt. Market conditions were not good, as large quantities of smoked herring were in stock from the previous year and had to be disposed of at a loss. Large supplies of Newfoundland herring were also on the market.

The mackerel catch shows an increase of 7,526 cwt., or 28 per cent, as compared with 1920. Guysboro county shows a decrease of over 5,000 cwt., due largely to the dog-fish pest, which prevented fishermen from setting their nets when the fall mackerel were running. Halifax shows an increased catch of 13,000 cwt., due largely to the big schools of small mackerel appearing on the coast during the spring and summer. The catch of large mackerel was fair, and as there was great competition among the buyers the fishermen obtained excellent prices, ranging from 15 cents to 40 cents for each fish. Thirty thousand pounds of mackerel were taken in the Bay of Fundy waters of Cumberland county. This is an unusual occurrence as mackerel seldom reaches the head waters of the bay.

The salmon catch shows a most encouraging increase of 1,475 cwt.

The smelt catch shows an increase of 1,289 cwt. Albacore shows a decrease of 483 cwt. and about 50 per cent decrease in the price. The decrease is accounted for from the fact that the American market, to which the fish are shipped, was heavily supplied by large landings taken on the American coast, consequently fishing operations were not nearly so active as during 1920.

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District No. 3, Nova Scotia West.

The general conditions were fair and the fishermen suffered to a less extent than in other districts.

Lobsters.—The weather conditions during the regular fishing season from March 1 to June 1, were most favourable, particularly for the large producing counties of Shelburne, Yarmouth and Digby, where the fishermen were able to haul their traps with hardly a day's loss throughout the whole season. With the exception of Kings county, where the catch rarely exceeds 250 cwt., every county shows a substantial increase.

The catch for the three months was 113,657 cwt., as compared with 95,948 cwt. for 1920. To this should be added the catch for the special season from November 1 to December 15, amounting to 32,733 cwt., or a total catch of 146,390.

The catch and pack by counties was as follows:—

	Catch	Pack
Lunenburg..	5,151 cwt.	455 cases
Queens..	8,219 "	465 "
Shelburne..	46,283 "	11,520 "
Yarmouth..	63,549 "	14,675 "
Digby..	21,389 "	3,541 "
Annapolis..	1,596 "	.....
Kings..	203 "	.....
	<hr/> 146,390 cwt. <hr/>	<hr/> 30,656 cases <hr/>

The cod landings were 1,077,581 cwt. as compared with 1,127,622 cwt. the preceding year. This shows a decrease of 50,000 cwt.

The haddock and hake catches also show very considerable decreases in the catches, the total decrease being 127,671 cwt.

The herring catch was reduced by nearly one-half, or from 113,763 cwt. in 1920 to 61,419 cwt. in 1921. From some unknown cause the usually heavy spring run failed to make an appearance.

It is gratifying to report that there were substantial increases in the catches of mackerel, halibut, smelt and salmon. The mackerel catch was 28,726 cwt., or an increase of 13,095 cwt. The halibut catch was 20,624 cwt., or an increase of 7,317 cwt.

NEW BRUNSWICK

In New Brunswick the lobster, smelt, salmon and oyster fisheries were the outstanding features. The smelt catch was 62,000 cwt. This valuable fishery is confined almost entirely to the four northern counties of Restigouche, Gloucester, Northumberland and Kent—Northumberland being the chief centre. This fishery is a most lucrative one to the fishermen, it being not unusual for the better placed netsmen to land \$500 worth in a single week. During the last season two men, operating together, disposed of \$1,600 worth as the result of four weeks fishing.

District No. 1, St. John and Charlotte Counties.

The lobster fishery was successfully prosecuted throughout the season, the catch of 9,012 cwt. being slightly greater than the catch for 1920. The value of the catch, however, shows a decrease as compared with the returns of last year. The catch is disposed of alive in the United States, as no canning is carried on in this district. The reduced value is attributed to the heavy supplies shipped from western Nova Scotia in May, and also to the shipments during the special season of six weeks from November 1.

Sardines.—The catch of 152,300 barrels was the smallest for some twenty years. The value to the fishermen was only \$1 per barrel. The following statistics for the four years, 1918-21, will show the seriousness of the situation:—

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	Catch	Value
1918..	295,753 brls.	\$1,478,963
1919..	214,510 "	276,565
1920..	196,562 "	284,533
1921..	152,300 "	160,783

It should, of course, be noted, that the heavy returns for 1918 were due to the abnormal conditions existing, when every possible effort was demanded to increase production, with a consequent rise in prices, the fishermen securing as high a rate as \$70 per hogshead of five barrels. Owing to the disorganization of the canned sardine trade the packers were unable to market the packs of 1918 and 1919, with the result that the following years the pack was light and therefore there was little demand for the catches. At the present rate of \$5 per hogshead, the fishermen have been heavily hit, as many of the weirs cannot be remuneratively operated at that price.

Herring.—The catch was 116,263 cwt., as compared with 236,358 cwt. the previous year. The catch was almost wholly in Charlotte county, where the greater portion is used for the smoked trade. It should be noted that the catch of 1920 was much larger than usual. This resulted in the markets becoming demoralized and smoked herring being disposed of at less than cost of production. The markets, however, are now showing good signs of improvement and there is every prospect that the important smoked herring industry of Grand Manan will be revived.

Salmon.—The catches of the net fishermen were the greatest for many years, being 4,150 cwt. as compared with 1,375 for the previous year. The increase is attributed to the abnormal dry weather conditions, which affected the rivers, keeping the fish in the coastal waters, thus enabling the netmen to secure large catches.

Alewives.—This fishery declined from a catch of about 13,000 barrels in 1920, to 3,250 barrels the past year. No satisfactory explanation has been given. It will be interesting to note the returns for the coming year, as it is possible that the fish ascended the rivers in the early spring freshets.

District No. 2—From Albert and Northumberland Counties to the Quebec Boundary.

The conditions in this district were, on the whole, quite satisfactory.

The lobster catch was 59,453 cwt. The pack was 22,356 cases. The catch for the preceding year was 55,711 cwt.

The smelt catch was 62,041 cwt., as compared with 39,938 cwt. the preceding year. The average price secured by the fishermen was 8½ cents per pound.

The cod catch was 75,361 cwt. The herring catch was 135,975 cwt.; 21,000 cwt. of mackerel were taken.

The tomcod or "frost fish" catch is noteworthy, the catch being 18,730 cwt. This fish, highly prized by many people as a good pan fish, has not yet been popularized in Canada, although considerable quantities are disposed of in Montreal. The catches are disposed of chiefly in the United States. The fishermen received only about \$1.50 per barrel and therefore little interest was taken in the fishery, the catches of which could be very greatly increased.

It is particularly interesting to note the large increase in the salmon catch. About 15,658 cwt. were taken. The catch the preceding year was 8,152 cwt. Record catches were made in the outside waters by the drift boats. The nets operating for hatchery purposes secured 3,200 fish from sixteen nets in six days. Large quantities of the catch were shipped to England.

District No. 3, Inland waters.

This district is confined to inland fisheries only, the principal waters being the St. John river and tributaries, and comprise salmon, alewives, pickerel, sturgeon, whitefish, shad, bass and eels. The total catches amounted to 3,126 cwt. This shows an increase of 1,506 cwt.

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It is interesting to note that 2,055 cwt. of shad were taken the past year. Owing to depletion this fishery was closed for the three preceding years. The quantity taken the past year was about double that taken in 1917 and it is hoped that the revised regulations, which will probably be effective next season, will result in safeguarding the fishery for many years.

The waters of this district constitute most important and valuable breeding grounds, besides affording abundance of sport fishing for the large number of visitors each year.

PRINCE EDWARD ISLAND

While there was a slight decrease in the total catch, the values greatly decreased as compared with the previous year.

Lobsters.—The catch was 63,816 cwt. The following statistics will reveal the heavy losses, both in catches and prices. It will be noted how large a part the lobster fishing and canning industry play in the industrial and economic life of the district:—

	1920		1921	
	Cases		Cases	
West Prince.. . . .	8,933	\$ 311,037	7,382	\$152,040
East Prince.. . . .	7,086	234,357	6,016	121,021
Queens.. . . .	7,818	280,626	5,969	122,190
Kings.. . . .	16,485	555,454	11,788	239,493
	40,322	\$1,381,474	31,155	\$634,744

It is particularly gratifying to note that the value of the campaign of instruction carried on the past several years for improving the quality of the Island pack has exceeded expectations. The quality has greatly improved. Much of the success is due to the lively interest taken by the cannery, who actively assisted the efforts of the instructional officers and experts in every possible way.

Oysters.—The catch was 3,792 barrels, valued at \$25,669, as compared with 2,775 barrels the preceding year. The outlook for this fishery is good as the catches of spat were excellent, resulting in bedding East and West rivers, Orwell, Vernon and Seal rivers with an abundance of small oysters.

THE LUNENBURG FLEET

The landings of the Lunenburg fleet were most gratifying, amounting to 269,830 quintals, as compared with 291,475 quintals in 1920, which was the largest catch in the history of the industry. The decrease was due wholly to the smaller number of vessels engaged, only 94 being employed, as compared with 117 in 1920. As a matter of fact, the average catch per vessel was greater than for many years.

The lack of the usual early spring operations accounts for the reduced total catch, as only five vessels engaged in early spring fishing, landing only 3,300 quintals, as compared with sixty-eight vessels in 1920, landing 30,000 quintals.

Under normal conditions the catch for 1921 would have greatly exceeded any catch in the history of the fleet. The drop in the prices since 1919, and the continued high operating expenses, taken together with the considerable supplies on hand from 1920, were the causes in the curtailment of operations.

The first six months of the year dried fish could hardly be disposed of at any price. In some instances the shore fishermen had to sell at \$4. The local and export markets gradually revived, and during the past month sales were made at \$7.

The preparations for 1922 are active, and will put a much larger number of vessels in commission.

THE LOBSTER FISHERY

Special attention has been given to the lobster fishing and canning industry and a very lively and wholesome interest developed. When it is pointed out that the catch the past year was 393,625 cwt. and that the pack was 137,607 cases, the whole having a marketed value of \$5,143,403, it will be seen that the lobster fishery, with the exception of the cod fishery, is the most lucrative and valuable of the Atlantic fisheries, particularly when it is remembered that the rate of the catch was less than half that received in normal years.

The fishery is, however, subject to great danger, as it lends itself more readily to unwise exploitation. The fishing seasons are comparatively brief, the returns immediate and lucrative. For the past several years a firm stand was taken against any extension of the fishing seasons, with the result that the balance between the catch and the natural increase was fairly well maintained.

On representations that the exceptional low employment condition of the past year, together with the low prices prevailing for the catches of the deep-sea fisheries—a special lobster fishing season from November 1 to December 15 was granted to the southwestern district from Cole harbour to Minas basin. This has been of little value to the fishermen, as the fish were not in good condition during a considerable portion of the special season. The shedding of the shell was too recent, with the result that the shell was thin and the meat poorly developed. The lobster was, therefore, weak, and the percentage of losses much greater than during the regular fishing season. A majority of the canners operating did so with reluctance, as the extra season endangered the stability of the markets, which were favourable for the disposal of the regular pack. A number ceased operating after a few weeks, owing to the fish not being in good condition. As a result of the poor condition of the fish, the live lobster trade was most unfavourable. The American markets were already well supplied, and the shipments during the special season hardly paid the expenses. Many of the fishermen who were vigorously opposed to the special season did not operate, while a large number took their traps ashore some weeks before the close of the season.

A further detrimental effect was that the fishermen of Charlotte and St. John counties, New Brunswick, suffered severely by the shipments of poor quality lobsters from Nova Scotia. Last year the opening price for the New Brunswick catch was 39 cents per pound. This fall the price was 13 cents per pound. The special season was, therefore, not only unprofitable for the fishermen but involved a serious economic loss.

While the special season may have been justified, the results here clearly show that its value to the fishermen was not at all commensurate with the economic loss caused by the unsuitability of the season, and the poor condition of the catch.

The lobster fishing and canning industry requires stabilization, and every possible action should be taken to this end. It is impossible to stabilize the industry unless the fixed fishing seasons are adhered to. Every canner, to a man, and many of the more prominent fishermen of the important fishing districts are strongly opposed to additional fishing seasons, or to any extension of the seasons.

Further, there is a noteworthy growth of opinion on the part of the fishermen, particularly of the coast west of Halifax harbour, in favour of prohibiting the slaughter of small lobsters, by the enactment of a size limit regulation. Halifax county is practically unanimous in this regard, and Lunenburg county gives the proposal of the Prospect district fishermen most hearty support.

Digby county fishermen have also taken action in the matter. The Bay of Fundy shore of that county is now operating under a size limit regulation, which was adopted at the request of the fishermen. At Cape St. Mary's where the fishermen operate a Union cannery, the fishermen are unanimous for a size limit, notwithstand-

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ing that the limit of nine inches proposed by them would put their factory out of business. Within the past few weeks the fishermen of Westport and other important lobster fishing centres placed themselves publicly on record as favouring the protection of the small lobster.

St. Mary's bay is one of the best natural breeding grounds on the coast, and with proper protection the lobster fishery of the bay can be very greatly enhanced in catch and value. The fishermen are alive to the advantages to be obtained by conservation, and their deliberate expression of opinion in this respect is an evidence of the high value they place on the fishery as a resource of prime importance.

THE OYSTER FISHERY

The oyster fishery is in an unsatisfactory condition. The total catch was 18,823 barrels. While the catch exceeded that for some years past it is only equal to the catch from the New Brunswick areas in 1900. As quickly as opportunity and circumstances afford a complete survey of the areas should be made, with the object of securing better control of the industry and the development of many hitherto unworked or little known areas existing along the whole coast, as well as working out a more satisfactory arrangement with the provincial authorities in connection with leasing for cultivation, and the defining of boundaries for mussel-mud digging. The farming population in the vicinity of the best areas in New Brunswick and Prince Edward Island highly prize the mud for fertilizing purposes and continually press to have the boundaries extended, with the result that digging operations are constantly encroaching on the live areas.

It is planned that a preliminary survey be made the coming summer for the purpose of ascertaining the possibilities and needs of the fishery. It may be pointed out that while the conditions in connection with the areas at Buctouche and Shediac, New Brunswick, and Malpeque and Richmond Bay, Prince Edward Island, are well known, little attention has been given to other portions of the coast where oysters of fine quality exist. In Nova Scotia there are productive areas at Ostrea lake, in Halifax; Tracadie, in Antigonish; Merigomish, and Cariboo harbours, in Pictou; Tatamagouche bay, in Colchester, and Wallace bay and Pugwash river in Cumberland. In Cape Breton, catches in fair quantities have been made at Orangedale and River Dennys in Inverness; St. Patrick's channel, Washabuck, McKinnon's harbour and Estmere in Victoria county.

It would appear that reasonable efforts for the preservation and development of this fishery would be fully warranted.

RIVER AND INLAND FISHERIES

The river and inland fisheries have not been overlooked, as they are not only of great value from a sport fishing point of view, but are quite essential in connection with netting operations carried on for the catching of salmon, smelts, alewives and other anadromous fishes. Many thousands of the residents and visitors find their recreation in the river fisheries. With proper exploitation it should not be difficult to very greatly increase the wealth of the river districts as a result of the increase of sport fishing.

The difficulties with regard to adequate protection should be appreciated. It is quite impossible at the present time, under any system of administration, to employ a sufficient force of officers to protect the innumerable rivers, streams and lakes of the Atlantic provinces. The best that can be done is to give reasonable protection to the more important streams. With the sparse population and the remarkable network of inland waters, illegalities are bound to occur. The impossible should be recognized.

The past year was not as favourable for sport fishing as former years. The extraordinary drought lowered the waters in the rivers and lakes, resulting in conditions that prevented successful angling. While considerable quantities of salmon ascended to the spawning grounds during the early freshets, the fish either continued in the coastal waters or remained in the lower pools where they showed little inclination to take the fly. Trout fishing was, however, quite good throughout the season.

The rivers have been kept free from obstruction and the fishways well looked after. Considerable work in this respect will be required this year as a number of the fishways on important streams will require to be either repaired or rebuilt. The operations of the saw and other mills have been closely watched, with the result that the rivers and streams are well protected from pollutions.

PATROL BOATS

The number of patrol boats employed at the beginning of the year was twelve. In view of the need of economy the steamer *Nelson*, operated at an annual expense of about \$9,000, was laid up and finally disposed of. This boat will not be replaced. Patrol boat *F*, Western Nova Scotia district, will not be operated the coming season.

With hardly an exception the boats were operated with greater satisfaction and value than for the past ten years. The machinery and equipment was kept in good order by the motor engineer, and little or no loss of time was incurred in repairs. While there were considerable seizures of illegal fishing gear, the operations of the boats were highly effective in preventing illegalities and assisting the shore officers in adjusting difficulties among the fishermen.

THE INTERNATIONAL SCHOONER RACE

The second International fishing schooner race was held off Halifax on Saturday and Monday, October 22 and 24, and enlisted very great interest, visitors being present in large numbers.

The challenge race was preceded by the usual beautiful and spectacular Canadian elimination race for the selection of the challenger, and was won by the Lunenburg schooner *Bluenose*, in charge of Captain Angus Walters, of Lunenburg.

It will be remembered that the challenge race of 1920 was won by the American schooner *Esperanto*, in the contest with the Canadian, *Delawana*.

The first race, Saturday, October 22, was over a course of 39.3 miles, starting from the Halifax breakwater. The American schooner *Elsie* crossed the starting line at 9.00.10, followed by the *Bluenose* at 9.00.49, and after a most exciting race, during which the *Elsie* kept the lead over a considerable portion of the course, she was beaten out by the *Bluenose* crossing the finish line at 1.33.05, or 12½ minutes in advance of the *Elsie*.

The second race, Monday, October 24, the *Elsie* again being first to cross the starting line—9.00.32—the *Bluenose* following at 9.01.52. For nearly three hours the Gloucester schooner had the *Bluenose* trailing in her wake, but the Lunenburg schooner showed her quality on the homeward stretch and crossed the finish line at 2.21.41, followed ten minutes later by the *Elsie*.

These races have awakened intense interest and will doubtless result in evolving a type of fishing schooner well adapted for both the salt and fresh fish fisheries.

SERVICES OF THE R.C.M.P.

Expression should be given to the valuable services rendered by the Royal Canadian Mounted Police, in assisting in protecting the fisheries of Prince Edward Island and in apprehending violators of the law at a number of points throughout the division. In several instances, where every local effort failed, the police succeeded in rounding up offenders. Inspector LaNauze has been most courteous and prompt in his assistance.

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ADMINISTRATION

The past two years have without doubt been the most trying period in the industry for forty years, with the result that satisfactory administration has been difficult, particularly when it is remembered that the organization of the Atlantic Division was coincident with the general demoralization affecting the fishery, and that the organization involved changes necessitating the employment of a staff of officers with little or no experience in the business. It could not therefore be reasonably expected that the new officers could secure in so short a time a satisfactory grasp of the many intricate, highly involved questions constantly arising. Much progress has been made in their training, although the permanent staff is not yet complete, as a number of the first appointees were found unsuitable and had to be released.

A most promising feature of this service is the evident desire of the officers to "make good". The inspectors speak highly of their zeal.

It will be of interest to note that the number of employees, chiefly special guardians, has been reduced by about three hundred, without any loss of efficiency in the service. Indeed, the consensus of opinion along the coast is that there has been a vast improvement in this respect, notwithstanding the fact that the staff of new officers have hardly passed the A B C's of their training.

The course of instruction given at Charlottetown, P.E.I., in September last, was most valuable, and included "Address and demonstrations on the growth of Bacteria", "The migration of fishes", "Demonstration on the curing and packing of pickled fish".

A conference was held with the lobster packers, at which a most informing address was given by Mr. W. F. Tidmarsh, Charlottetown.

In addition, the chief inspector held over thirty conferences with the fishermen, packers and dealers, all of which was of very great advantage from an administrative point of view. The fishermen were particularly appreciative and gave evidence of a much increased interest in the service generally.

Twenty thousand seven hundred and fifty-three licenses were issued during the year, and 290 prosecutions undertaken for infractions of the Fisheries Act. The duty of the officers in enforcing the regulations is not a pleasant one, but is quite essential not only from the fishery protective point of view, but also in the interest of good citizenship generally. One law easily evaded brings other laws into contempt. An unpunished lawbreaker comes to hold himself above the principle of the "Greatest good to the greatest number" and this results in appeals for special privileges, to the detriment of the general public. Happily, many of the fishermen are becoming the best advocates of law observance, with the result that illegalities are not as prevalent as in the past. This is particularly true with respect to the valuable lobster fishery. In several of the more important districts illegal fishing has practically disappeared.

DEVELOPMENT

The general development of the industry must in the nature of things depend quite largely on the export trade. While there is no limit to the possible catch of deep-sea fish, particularly cod and haddock, the fact remains that the catches from these fisheries must be coincident with the expansion of the markets. There is no doubt that a large fleet of trawlers could secure heavy and steady catches, but experience has shown that the present market demands are not equal to the possible catches of the five trawlers now in the service. Indeed, the past year the fresh fish markets could not absorb ordinary catches, with the result that the trawlers have either to be laid up for about six months each year, or put in the salt fish trade, or otherwise employed. It is safe to say that every possible profitable market is being carefully exploited. The development of the deep-sea fisheries must depend on the

ability of the markets to absorb the catches. It is therefore beside the mark to lament the lack of very large development either in the catches or fishing equipment, as the development of our fisheries must go hand in hand with the development of the markets.

It should be pointed out, however that several districts, particularly on the Cape Breton coast, are sadly handicapped by the lack of cold storage, salt supplies and satisfactory transportation facilities. While it has been urged that salt depots and cold storage facilities should be furnished by the department, the wisdom or practicability of such course is very greatly to be doubted, as experience has shown that any proposition of this character that can be based on sound business practice, will be looked after by private enterprise, otherwise the difficulties and embarrassments are obvious.

Opportunities are constantly arising for the utilization of little known products of the sea. For instance, a side line of considerable promise developed in Grand Manan the last year in connection with the smoked herring industry. In this trade, which is a large one, it is necessary to remove the scales from the fish before salting for the smoke-house. The scales were a waste until last summer a New York company, engaged in the manufacture of artificial pearls sent their operators into the district and purchased large quantities of the scales, for which 5 cents per pound was paid. The total amount expended was \$17,000, and it is contemplated to very greatly increase the business the coming year.

Also, inquiries have been made as to the possibility of securing large quantities of dulse, for which a ready market is assured. For some years past considerable supplies have been gathered, chiefly at Grand Manan, N.B., and Digby, Nova Scotia, although a good quality of dulse may be easily secured at many points along the Atlantic coast. About 1,000 cwt. was prepared for the market the past year, the value of the catch at Grand Manan being \$5,880. It is reported that prospects of developing a value of at least \$50,000, is probable. The usual method of taking and preparing dulse for market is to strip it from the rocks at low tide, and sun-dry for several days. This method of preparation is crude, as the production of the best quality depends upon perfect weather conditions. Doubtless with the probable development of the industry, artificial drying methods will be introduced.

It will also be interesting to note that an American firm, known as "The Marine Fish Products", are operating at the old Government Reduction plant, Canso, manufacturing fish meal and fish oil from dog-fish. Fish meal, which contains a high percentage of protein (about 80 per cent) is used mixed with other brands of meal, for cattle feed, and has a ready market, at a fair price. Fishermen were paid \$6 per ton for dog-fish landed at the plant. A sufficient supply, however, could not be obtained the past year to make the operations the success anticipated. The lack of raw material was due to prevailing weather conditions during the run of dog-fish, as well as to the lack of a sufficient number of fishermen engaging in the catching of the dog-fish.

In view of the large investment in the fisheries of the province, and also in view of the large turn-over each year, and particularly in view of the fact that the industry gives direct employment to over 40,000 persons, and employment to a very considerable number in allied industries, it is obvious that it occupies a very important economic position. A study of our shore population will make clear the large part the fisheries play in the life of the province. Important towns and villages all along the coast are wholly dependent on the fisheries for their existence, while large stretches of the coast now thickly settled, would have remained unpopulated. Every endeavour to lighten the burden of the fishermen; to safeguard their interest, and to encourage the industry would be justified.

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REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA FISHERIES OF QUEBEC FOR 1921

I have the honour to submit my report regarding the fisheries of the Gulf Division for the season just closed.

Such season is specially remarkable for the fact that following the decision rendered by the Privy Council and dated November 30, 1920, the Federal Government was given authority of assuming the administration of the fisheries in the waters accessible from the sea by way of navigation and which had been previously placed under the jurisdiction of the provincial authorities. Such measure affected all the fishermen established along the St. Lawrence from Montreal to the gulf, as well as those inhabiting the peninsula of Gaspé. It was easy to foresee, from the very outset, that its application would be such as to raise a strong opposition, in all quarters, on their part, since they were to be compelled to take out two permits to keep their fishing apparatus in operation.

It became necessary, following short preparations, and with an untrained staff, to give the right direction to the service in such a way as to molest in the least possible way those affected by that change of administration, and show an attitude tending to strongly impress the public with the necessity for all to comply with the directions of the Order in Council dated April 20, 1921.

The fishery overseers were instructed:—

1. To renew, in the name of the same persons, all the fishing licenses granted the preceding year.
2. To require that all the fishermen, without any exception, take out licenses from the Department of Marine and Fisheries, such as provided by the new regulations.
3. To use all reasonable means with a view to inducing them to comply with same;
4. To never have recourse to rigorous measures before having exhausted all possible means of persuasion.
5. To ignore the pretensions of the Provincial Government concerning the jurisdiction of the fisheries and to avoid to get involved in any argumentation with anybody in connection therewith.

Owing to their tact, good behaviour and broadmindedness, the fisheries overseers succeeded in imposing a satisfactory control without exciting much discontent, or interfering with the fishermen's undertakings. In five cases only it was necessary to take legal proceedings against those refusing to comply with the regulations.

The *Loos* being ready to put to sea on May 12, I left Quebec to undertake the regular service and assume direction of same as in former years. Taking advantage of the information gathered, I devoted all my attention to the places where the fishermen, under the influence of erroneous directions, intended fishing without any other permits than those they had procured in the past. I advised them promptly to change their decision by indicating to them all the annoyances and inconveniences which might result from such an attitude, and afterwards, until the end of the season nothing particular happened in that connection.

The fishing industry continues to be demoralized by the unfavourable circumstances resulting from the abnormal conditions of the markets. The value of the total production compared with that of 1920 has decreased by about \$1,000,000.

The number of fishermen was less than that in the preceding year by about 8 per cent. The fishing apparatus and implements are not being renewed; the boats rendered useless are not replaced, and no less than 400 remained inactive during the last season. These conditions seem to deserve serious attention.

The following is a summary of what I noted throughout the different sections of my district where the principal species of fish caught are: cod, lobsters, herring, salmon, mackerel and smelts.

COD

The low prices offered for that fish as well as the high cost of all the necessary articles and goods have strongly contributed to discourage a considerable number of fishermen who made all the efforts possible to find elsewhere more remunerative occupations. Those who persisted in their old vocation were compelled to do so because they failed to procure some other employment.

In the Canadian Labrador, cod appeared in large schools during June and July. The seventy schooners from Newfoundland which resorted to that coast at the regular time, obtained much success, havy re-sailing with complete cargoes og fish. The Canadian fishermen not impeded by illness from devoting their time to the fishing operations made also important catches. The yield in that section is greater than that of last year. The fishermen were specially favoured by the absence of ice as well as by fine weather.

From the mouth of the Saguenay as far as Natashquan, the fishermen did not carry on any fishing operations, till about the middle of the season. They were then improperly equipped and did not show much activity. The yield was poor. The unsatisfactory results obtained must be attributed to the prices, shamefully low, paid for dried cod, and which amounted to \$2 or \$4 per hundredweight, while the fishermen of the South Coast received from \$7 to \$11 for products of the same grade.

In the county of Gaspé, from Fame point to cap Chat, the cod fishing operations were conducted with much energy. The fishermen of that district have taken to the habit of exporting themselves their products to Europe, through the banks, and of keeping themselves closely connected with the conditions of the markets.

More circumspect, better informed, and less subordinate to the dependence of the fish dealers than those of other portions of the district, they foresaw that good results could be derived from marketing their fish products and this explains why they devoted themselves with such zeal to their fishing enterprises, and the remarkable success which resulted therefrom.

In the other part of the county of Gaspé, at Magdalen islands and in the county of Bonaventure, the yield was inferior to that of last year, which is due to the low prices offered to the fishermen, from the very outset of the season. Such a state of things tended to discourage a certain number of them who applied themselves to some other ocupati^ons.

LOBSTERS

The lobster fishery was below the average. At Magdalen islands, the total production only amounted to 12,178 cases, against 16,618 cases in 1920. It would, however, be premature to conclude that such a decrease in the output is a sign of depletion. In consequence of the unfavourable conditions of the market and the high cost of the material necessary for carrying on fishing, the operators of the lobster factories thought it wise during the preceding winter to reduce their preparations in comparison with those undertaken in the past. The decrease of lobster traps in operation and the violence of the winds, during the months of May and June, may be regarded as the principal causes of the failure in this fishery.

Along the coast of Gaspé and Bonaventure, a decrease has also been recorded, while in the Canadian Labrador, the production has varied little.

HERRING

The spring herring appeared in large schools all along the northern part of the St. Lawrence gulf, but, unfortunately, our fishermen were not in a position to take advantage of their presence.

Up to the last years of the war, the sale of herring to foreign fishing vessels, which utilized them for bait in the cod fishery carried on on the banks, was a source

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of considerable revenue for the inhabitants of the Magdalen islands. Since then, as no markets can be discovered for smoked or salted herring, and as there are only a limited number of vessels from the United States, Nova Scotia and other countries visiting the islands, with a view to supplying themselves with bait, the islanders have no interest in carrying on this fishing, but for the purpose of feeding the local market. During the last season their fishing operations were necessarily limited, and as far as it may be foreseen, this state of things will continue for an indefinite period, that is, as long as no proper method of utilizing their catches has been discovered.

In the majority of cases their revenue was insufficient to cover the operating expenses; some fishermen could not even secure a sufficient amount of profit to pay their license fees.

In the Canadian Labrador, fall herring, usually in great demand on our market, was inferior in quality, and its production was rather small.

SALMON

The statistics tend to show that the catch of salmon in the Gulf Division has doubled that of last year, having amounted to 7,805 hundredweights, compared with 4,929 in 1920. The cause of this increase cannot be explained.

If it is true to state that the general results were more encouraging throughout the different parts of the district where such fishing is carried on, it cannot be concluded that all the fishermen were equally favoured. As the water was very low and limpid in the rivers, from the very outset of the season, due to the lack of rain in spring, salmon ascended them without staying any appreciable time in the sea-waters, and consequently those having nets set in the estuaries of rivers and surroundings, were the only ones to effect profitable catches. The others operating stations usually fairly productive, but more distant, obtained so little success that the expenses exceeded the revenue they succeeded in deriving from such fishing births. These remarks apply especially to the county of Saguenay.

A fact worthy of mention which many seek to explain in a satisfactory way, without however succeeding to convince everybody, is that the size of salmon were much less on the average. In the counties of Bonaventure and Gaspé, they assert it has never been observed that the weight of salmon had fallen off to an average of 8 pounds before.

MACKEREL

This fish which had deserted the waters at the entrance of Gaspé Bay, the surroundings of Seven islands and Baie-des-Chaleurs for a number of years, tends to re-appear in more and more considerable quantities. In the county of Bonaventure where the mackerel might produce great benefits, since it is possible to ship the fish by rail, in a fresh state, the inhabitants who had given up the habit of carrying on that fishery, are now devoting to it much more attention and to that end are undertaking to equip themselves with more modern fishing implements.

At Magdalen islands spring fishing was fairly profitable, while that carried on in the fall proved a complete failure, due to the unfavourable weather conditions. Raging winds did not cease blowing during the month of September.

The proceeds of the sale were very satisfactory. The appointment of a resident fish inspector at Magdalen islands contributes to improve the quality of all kinds of fish prepared there for the market. I have personally ascertained that that officer has undertaken a campaign of instruction among the fishermen, and I have been informed that his influence has already produced good results in connection with the salting of mackerel.

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SMELTS

The smelt fishery which cannot be carried on with profit but in the county of Bonaventure and in a portion of the county of Gaspé, that is to say, at such localities through which runs a railway line, has yielded 922 hundredweights more than last year.

Such results may be attributed to an increase in the number of fishing licenses granted.

FISHING LICENSES

The following is a comparative statement of the fishing licenses issued during the two last seasons:—

Licenses	1920	1921
Herring (trap-nets).....	41	29
Cannery.....	3	3
Lobsters factory.....	71	75
Lobsters (fishermen).....	627	951
Salmon (gill-nets).....	155	347
Salmon (angling).....	....	16
Trout (gill-nets).....	....	5
Sturgeon (gill-nets).....	....	5
Cod (trap-nets).....	272	264
Smelts.....	....	193
Weirs.....	....	74
Hoop-nets.....	....	67
Seines.....	....	40
Night-lines (ligne de fond).....	....	55
Eel weirs.....	....	274
		<hr/> 2,416 <hr/>

The patrol season on board the Loos closed without any casualties, and we came back to Quebec on October 28.

Fishermen other than Canadians who appeared in small numbers on the coast of Labrador and Magdalen islands have faithfully complied with the regulations. The fisheries law has, in a general way, been well observed; in addition to the five prosecutions above mentioned, it was necessary to take eighteen further legal proceedings against certain fishermen of Port Daniel and surroundings for having not adapted their salmon nets as prescribed by Section 18, sub-section 6 of the regulations; one for having thrown saw-dust into Sainte Anne des Montes river, and two others for having used dynamite in Saint Jean river (county of Gaspé).

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE FISHERIES DIVISION, FOR 1921

I have the honour to submit herewith my annual report on the fisheries of the Central Division.

In the province of Alberta there has been a slight increase in the commercial catch over the year 1920. At the same time there has been a decrease in the number of fishermen operating, this latter was no doubt caused by the adverse condition of the markets in the first six or seven months of the year.

During the course of the summer the Mackenzie Basin Fisheries, Limited, commenced the erection of a cannery and salting and smoking plant on the shore of lake Athabaska, about twelve miles northwest of Black bay. A considerable amount of fishing equipment in the shape of motor boats, dories, scows was taken in to the site of the plant. The machinery for the plant was taken in and installed, actual canning operations commencing on September 14, the plant operated daily from that date until September 30, during which period the output was 645 cases of canned trout, 62 cwt. salted trout, twenty cases canned whitefish and ten cases of smoked

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whitefish, all of which I understand was shipped out to Edmonton. It is too early to make any statement as to the future success of this cannery. A market will have to be created and shipping facilities greatly improved, before, in my opinion, profitable competition with the long-established canneries can be maintained.

In the southern part of the province all reports received go to show that the closing of the trout streams for a period of two years has attained the desired result, and that fish are now more plentiful than in years past. It has been suggested that the streams within the limits of the forest reserves be closed to all fishing, if this action is taken, it will mean the preservation of the spawning and breeding grounds of the trout and the effect will be beneficial in all the southern district of Alberta.

In the province of Saskatchewan there was a slight decrease in the total quantity of fish taken for commercial purposes, also in the number of fishermen engaged in the work. This can be accounted for by the depressed condition of the markets earlier in the year, which resulted in the fishing companies holding off until such time as they could see clearly where the catch could be disposed of. I may say that the administration of the fisheries of this province has been eminently satisfactory during the year. The officers are all experienced and keen on their work, and have certainly given their best efforts to making a success of the supervision of their different districts.

It was found necessary to close Lowes lake to summer fishing for whitefish, this lake being the principal summer fishery in the province it was feared that it was being subjected to too heavy fishing and this course was taken in order to give it a chance to recover. The closing of this lake may have had some slight effect in lessening the total quantity of fish taken, but it was a necessary action and will well repay the present loss when again opened.

In the province of Manitoba, in spite of very precarious market conditions during the first six or seven months of the year, there has been an increase in catch. For the past four or five months the market has steadily improved, so that where a loss was anticipated a certain amount of profit was found instead. Sturgeon fishing was carried on during the winter in the Churchill river for the first time. These operations were not successful to those engaged in them owing to the difficulties encountered in transporting the catch from the fishing grounds to the nearest shipping point, however, there was no loss by waste of fish, I am glad to say.

During the month of June, the Assistant Deputy Minister of Fisheries visited Winnipeg and Winnipegosis, where he met a large number of delegates, appointed by the fishermen of those districts and with them discussed certain changes in the regulations which they desired. Practically all of these changes were granted. At these meetings the fishermen were shown clearly that it was the desire of the department to show them every consideration, and to advance their interests in every way, compatible with the proper preservation of the fisheries. This fact I feel sure the fishermen fully realized.

In general I may say that the reorganization of the fishery service in the Central Division was completed during the year, and it is already noticeable that this reorganized service is doing good work and is working smoothly. The officers are helping the fishermen to the best of their ability; showing them that they wish to co-operate with them in bettering the fishing industry in every way; urging them to place their catch on the market in the best possible condition; and teaching them that observance of the regulations is solely for their own benefit. While there is in certain districts a certain amount of illegal fishing, I think that this condition is improving, wherever it is sharply checked and the examples made are having their effect.

It is noticeable that the general lowering of prices of meat and foodstuffs is not followed by the price of fish. In my opinion the price is much too high to make it a popular article of diet. So long as a very large percentage of the catch of these

provinces finds an unlimited market, with high prices, in the United States, the price will keep its present level. In comparison with most other foodstuffs, fish is and has been the highest priced article of food in the market. With the reduced cost of production, now evident, I hope during the coming year to see fish take its proper place as a food and that its consumption will greatly increase. The efforts of the officers of this division to accomplish this will I am sure have a certain amount of effect.

I desire to record my appreciation of the officers of this division, as a whole, for their co-operation and support in the work of supervising the fisheries of these three provinces. I would also convey my thanks to that efficient body, the Royal Canadian Mounted Police, for the assistance given us, especially in the outlying portions of the country, where it is not possible for our officers to make numerous patrols, there, their assistance has been invaluable, and their whole-hearted co-operation with our officers has been pleasant to see.

In conclusion I may say that the year 1921, taking into consideration the very adverse market conditions obtaining throughout the first half of the year, may be considered a fairly successful one. It is apparent now that the limit of depression in the fishing industry is passed and that the future will be most successful.

REPORT OF CHIEF INSPECTOR, MAJOR J. A. MOTHERWELL, WESTERN FISHERIES DIVISION (BRITISH COLUMBIA), FOR 1921.

The value of the fisheries products of the province of British Columbia exceeds that of any other province in the Dominion of Canada, in the fiscal year 1920-21 being 45 per cent of that of the whole Dominion.

SALMON

First in value comes the salmon, the pack of which during the season just closed amounts to 602,657 cases of all varieties. The preceding season the total pack was 1,187,616 cases, or close to 100 per cent greater than the year 1921. Not since the year 1908 has the salmon pack in this province been so small. This is due principally to the practical failure of the sockeye run together with the fact that owing to the condition of the markets there was no incentive for the canners to pack springs, cohoes, pinks, or chums.

The sockeye pack for the whole province during 1921 was 163,914 cases against 351,405 cases for 1920 and 339,848 for the brood year of 1917, and in the big year of 1905, 1,080,673 cases. It will be plainly seen that the supply of this variety of salmon has become alarmingly depleted. This is particularly the case in the Fraser River district where the pack this year was only 35,900 cases and where, unless some co-operation can be obtained from the interests on Puget sound, the small supply which annually comes to this locality will undoubtedly be entirely wiped out.

In the northern district, the Naas river appears to be going the way of the Fraser and would appear to call for some very drastic action.

The sockeye pack on the Skeena has been the worst in the history of that stream and the experience during the past season at the Bella Coola, Rivers Inlet and Smiths Inlet districts has been also extremely disappointing.

The sockeye variety being by far the most valuable has in the past been fished much more intensively than others and there would appear to be no doubt that this is the chief cause for the present condition. In spite of the fact that the amount of fishing equipment has materially increased the catch has been becoming less.

It has been suggested that during the period of the war when the cry was for food, more food, and still more food, a much larger proportion of the salmon runs

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was taken than would have been the case under normal conditions and the industry is possibly now feeling the result of that intensive fishing in the brood years of the four-year cycles.

It has been intimated by a most eminent authority on the salmon on this coast that this year's small run may be due to a large extent to the conditions found on the feeding grounds between the time the fingerlings left the fresh water and the time they returned from the sea as mature fish. In the Skeena district the sockeye during the past season were of an unusually small average in size and this fact may confirm the above theory.

Another cause mentioned is the fact that four years ago, in 1917, there occurred a series of unusually violent freshets. These extended practically over the whole coast of British Columbia and particularly north of the Fraser river. These occurred, unfortunately, shortly after the sockeye salmon had finished spawning and resulted in the spawning beds being largely destroyed and huge quantities of eggs totally lost.

It is very probable that each of the above three reasons was a contributing factor to this year's conditions and the situation being as it is, extraordinary means are imperative to conserve and if possible restore the runs of the sockeye salmon to the several areas.

The runs in recent years show conclusively that in the past there has not been a sufficient escapement of parent fish of the sockeye variety to the spawning grounds. That being the case and if fishing operations were carried on with no greater intensity than up to several years ago, the necessity for some curtailment would still be apparent, but in the light of the last few years experience when larger quantities of gear were used and in spite of which the catch became smaller, the necessity for some drastic action is much more evident and there is no alternative but to provide immediately for a much larger escapement.

Undoubtedly the first consideration of the administration is the conservation of the supply as it can be readily realized that if the supply of raw product is not maintained it will only be a matter of time when the salmon fishing industry will be a thing of the past. The most efficacious way of assuring an adequate escapement of parent fish is by means of curtailing the fishing in the way of increased weekly closed periods, a shorter fishing season, the lowering of the fishing boundaries, or all three methods, at the same time increasing to the greatest extent possible fish cultural operations and efforts in the way of clearing from the salmon streams all obstructions to the ascent of the parent fish to the spawning beds.

To insure a sufficient escapement of salmon it may become necessary to so curtail fishing operations as to make them unprofitable to both fishermen and canners and other branches of the industry until the runs have been again built up. In this way the salmon supply would be preserved but it is possible that the industry, which is already in a precarious position financially owing to the last few years experience, may be irretrievably injured and the situation is so serious as to require the most careful consideration.

On the other hand if no prompt and adequate action is taken and if the runs are permitted to decrease each season it will be only a very short time before the runs of sockeye are so depleted as to result in the loss of employment to thousands of fishermen who now depend on the sockeye fishing and in addition the numerous canning establishments will be unable to operate for lack of a supply of this particular variety of salmon.

Under the present conditions there is only one course open and that is to preserve the supply and steps are being taken towards this end and will be applicable to operations in 1922.

During the season just ended greater restrictions were placed on the sockeye fishing than in previous years, the season being closed earlier than usual and at one point in particular the weekly closed season considerably extended.

Owing to the fact that the fall grades of salmon have not been in such demand as the sockeye there have not been fished to the same extent and do not show serious depletion apart from several points which will receive particular attention in the future from the standpoint of conservation. The supply of pinks and chums has been well maintained and although the packs of these varieties for the past year have not been large it was due to the anticipation that the market would not be in a condition to absorb any quantity.

The spawning areas of the fall varieties were well seeded this year although in certain localities fishermen were disappointed at not obtaining as large a catch as they expected. This was due to the streams being so high and there being so much fresh water that the fish instead of having to wait at the mouths of the streams for the water to rise, proceeded immediately up to the spawning beds and so escaped the nets. Fishing for pinks and chums is mostly carried on by means of seines although a considerable quantity of pinks is taken in the gill-nets during the sockeye season.

The supply of red salmon being apparently insufficient to fill the market requirements it is very probable that the demand for pinks and chums will be considerably increased and although there is no marked depletion in the supply of the varieties there is no doubt that in order to insure the runs against being overfished the proper steps will be taken next season to the end that the experience in connection with the sockeye supply will not be repeated in the case of the fall varieties.

A good run of spring salmon was experienced during the season 1921, in the northern district, the fish averaging about thirty pounds. The run of this variety to the Fraser River was satisfactory. The same may be said of the West Coast of Vancouver Island. It is regretted that probably eighty per cent of the catch of this variety in that district is exported. Sixty per cent of the fishermen trolling for salmon on the west coast during 1921 were Japanese who account for at least eighty per cent of the catch, practically all of which goes to Puget Sound points in a fresh or mild cured state

Export of Salmon.—Under the present regulations fresh salmon, with the exception of the sockeye variety, are permitted to be exported free of export duty. The following are the quantities so shipped from the province during the past three seasons and mostly for processing in the United States:—

1919—	25,557,000	pounds.
1920—	4,346,000	“
1921—	9,084,300	“

The majority of the above quantities was purchased by interests from Puget sound and conveyed to the canneries in those waters, canned and placed on the markets of the world under labels announcing that the contents were *British Columbia salmon packed on Puget sound*.

Unfortunately owing to the long distances the fish are carried when exported and the delay in the collecting boats obtaining loads, the salmon, when it reaches the cannery, is not always in a fit condition to be packed. In past years it has been canned, however, and the injury done the British Columbia industry by the processing of this inferior fish, some of which was found to be unfit for human consumption, will be appreciated.

It is anticipated that with the demand for the fall grades of salmon improving the Alaskan and Puget sound cannery interests, whose own supply of raw product has been depleted, will be coming more and more to Canadian waters at the expense of the British Columbia industry.

In this connection it is interesting to note that an export duty of two cents a pound would have resulted in a revenue to Canada amounting to \$779,746.

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HALIBUT

Next in value to the salmon comes the halibut fishery. During the twelve months just ended the total landings in British Columbia ports amounted to 32,586,800 pounds. Of this amount 13,055,400 pounds were landed by Canadian bottoms and 19,531,400 pounds by American bottoms.

No licenses are required in the case of halibut fishermen owing to the fact that practically all operations are carried on in extra territorial waters. There is, therefore, no revenue from this source apart from the customs duties although the benefit derived from so many boats calling at Canadian ports where they are permitted to outfit, dispose of their catch and engage crews, will be readily appreciated.

As each season passes, the necessity for a closed period in connection with this fishery becomes more apparent. The numerous reasons have already been very thoroughly gone into by the Canadian American Fisheries Conference of 1918 and in the report submitted it is ably demonstrated that neglect to protect halibut during the winter months would have absolutely no justification and would result in the absolute ruin of this enormously valuable fishery.

It will be extremely regrettable if the American Senate refuses to ratify the proposed Halibut Treaty and it is sincerely hoped that the remarkable unanimity of all concerned, both Canadians and Americans, on the absolute necessity and desire for such protection, will result in the hoped for ratification.

HERRING

The supply of herring on the British Columbia coast shows no depletion. The pack put up by the several different methods, varies from year to year naturally owing to market conditions. During the past season 2,417 barrels of herring were Scotch cured in the Barclay Sound district and for which a demand was found principally in the Eastern States; 4,149 cases were canned and 23,998 tons were dry salted for the Oriental market. Smaller quantities of this variety of fish were smoked and also placed on the local markets in a fresh state.

Apart from Nanaimo and Barclay sound, herring is not caught in large quantities except in the Prince Rupert area where large amounts are used fresh and frozen each year for the purposes of halibut bait. During recent years American boats proceeding north to the halibut grounds have been able to obtain supplies of bait at Barclay sound points and Nanaimo and it is expected that the quantities in the southern part of the province will be considerably increased in the future.

PILCHARDS

During the calendar year 1920 there were 91,197 cases of pilchards packed and during the year 1921 only 16,091 cases. The decrease is due entirely to market conditions as this very desirable variety of food fish is very abundant on the west coast of Vancouver island.

Recently new markets have been developed in New Zealand, Australia and India and it is anticipated that in future years large quantities of pilchards will be packed and shipped to those points.

SUNDRY VARIETIES

In addition to the varieties specially mentioned there is a great number of other edible fish which are taken to a more limited extent. Included in these are the cod, flounder, sole, skate, smelt, octopus, clams, crabs, shrimps, sturgeon, perch, abalone and oysters, the great proportion of which are used fresh and which in the aggregate represent a very considerable value annually.

WHALING

Due to market conditions for the products of these mammals, no whaling operations have been carried on in British Columbia during the season 1921, the stations at Naden Harbour, Rose Harbour and Kyuquot being closed. Prospects look considerably better, however, for next season and it is anticipated that hunting will be resumed in 1922.

FUR SEALS

There were 2,349 fur seals taken off the coast of British Columbia under Article 4 of the Pelagic Sealing Treaty of 1911, which permits Indians to hunt these animals by means of canoes propelled entirely by oars, paddles or sails and without the use of firearms, and preparations are under way to hunt fur seals during next season on a larger scale. These operations require careful supervision by the boats of the Fisheries Protection and Fisheries Patrol Service in order to insure that the provisions of the treaty are not violated.

REDUCTION WORKS PLANTS

During the past season seven plants were operated for the purpose of the manufacture of fish meal, fertilizer, and the rendering of oil from the non-edible fishes, sharks, hair seals, and the offal from the numerous canneries. During the period of the war there was considerable activity in this industry owing to the abnormally high prices of fish oil. During the past few seasons, however, the prices have been so low that the profits have been reduced practically to the vanishing point.

This class of industry is deserving of every encouragement, particularly as grayfish are used in very large quantities, resulting in the destruction of a fish which is so injurious to the runs of the edible varieties. In addition the offal from the canneries and cold storage plants is collected and processed, thereby obviating the necessity for the dumping of this raw product in most undesirable places and eliminating the expense of towing it long distances to deep water.

From the shark skins, excellent leather has been manufactured and it is regretted that the operations of the one plant in the British Columbia waters which used sharks, found it impossible to continue. The supply of the raw product is abundant and no doubt this branch of the industry will be properly developed in the course of a few years.

HAIR SEALS AND SEA LIONS

During the past season the demands for some action by the department with a view to eliminating hair seals and sea lions from the salmon fishing grounds has become more insistent. There is no doubt that vast quantities of very valuable salmon are destroyed, resulting, in certain localities, in the difference between profit and loss to the fishermen. It is hoped that some means may be shortly devised whereby these pests can be exterminated or at least so reduced in numbers as to bring relief to the salmon fishing industry. The seals are difficult to destroy, in any appreciable numbers, but the sea lions are a fairly easy prey when hunted on their rookeries.

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LICENSES

The following statement shows the number of licenses issued during the year 1921 in the Province of British Columbia:—

	1921	Increase over 1920	Decrease
Salmon gill-net—			
Whites and Indians..	2,681	151	....
Other nationalities..	2,096	....	132
	<hr/> 4,777	19	....
Salmon trolling—			
Whites and Indians..	957	....	278
Other nationalities..	505	....	8
	<hr/> 1,462	....	386
Salmon cannery..	56	....	10
Salmon trap-net..	8	....	11
Salmon purse-seine..	59	....	103
Salmon drag-seine..	34	....	11
Salmon saltery—			
Whites and Indians..	26	23	....
Other nationalities..	9	....	....
	<hr/> 35	23	....
Herring gill-net—			
Whites and Indians..	36	....	2
Other nationalities..	21	11	....
	<hr/> 57	9	....
Herring purse-seine..	25	....	10
Cod gill-nets—			
Whites and Indians..	31	....	3
Other nationalities..	80	....	....
	<hr/> 111	....	3
Other varieties—			
Whites and Indians..	567	43	....
Other nationalities..	386	72	....
	<hr/> 953	115	....

PATROL SERVICE

The British Columbia coastal waters during the past season were patrolled by two steam and eighteen gasoline boats the property of this branch of the department. In addition thirty gasoline boats were chartered during the fishing season, making a total of fifty. It will be appreciated that with a coast line of approximately 7,000 miles containing hundreds of inlets, bays and streams where fishing is carried on, it is imperative that an efficient patrol service be maintained to the end that the valuable fisheries resources of the province may be preserved. A great majority of the hundreds of streams entering into the sea are frequented by some variety of salmon, and if great care is not taken to cover all territory it would be a very simple matter for the runs of salmon, particularly the fall varieties, to be exterminated. While it is not possible to cover all streams as adequately as could be desired, at the same time, consistent with reasonable economy, the patrol service has proved to date fairly satisfactory. If intensive fishing for fall varieties of salmon develops there is no doubt that the patrol must be considerably increased if the salmon supply is to be saved.

It is interesting to mention the fact that during the past season a certain amount of patrolling was done by means of one of the government sea planes maintained at the Jericho Flying Station in Vancouver. During the season the officers of this department used this method to the extent of forty-eight hours' actual flying time and were able to cover long distances with a saving of much valuable time and with the result that considerably greater efficiency was effected in those parts where this method was adopted. It was hoped that the flying service could be utilized to a very large extent and possibly be substituted for several of the gasoline boats. However, owing to the fact that the air craft cannot be used at night in the fisheries service and also to the fact that weather conditions, fog particularly, often prevent flying, it was not found possible to make as much use of the service as was anticipated. In addition to this the expense in connection therewith, unless it will result in some great saving of time, is hardly commensurate with the benefits obtainable.

As an example of the saving in time it is interesting to refer to a trip which was made from Vancouver to Anderson and Kennedy lakes on the west coast of Vancouver island. Owing to the transportation facilities to these more or less inaccessible points, the journey by ordinary means would have consumed probably seven days. By means of the sea plane the officers were able to leave Vancouver at eight o'clock in the morning, spend three hours at each of the hatcheries situated on the above-mentioned lakes, and return to Vancouver by six o'clock the same evening.

Mention should be made of the increased efficiency and economy to the Patrol Service resulting from the appointment of a highly qualified gasoline engineer who takes charge of all the repair work of these launches at the end of the season and keeps them in running order during the period they are in commission. The expense to the department in the way of his salary is saved many times over each season.

EBERTS' REPORT

It is with considerable gratification that the report of the commissioner, the Hon. Mr. Justice D. M. Eberts, has been received after his investigation into the several charges against the administrative officers of the British Columbia branch of the Fisheries Service. It is exceptionally gratifying to find that all the charges made have been proved to be absolutely without foundation and on the contrary the commissioner in his report specially testifies as to the efficiency of the officials of the Department of Fisheries in British Columbia and particularly to those who were charged with irregularities, dereliction of duty and partiality. Judge Eberts states with the greatest of emphasis that not the slightest evidence was adduced to convince him that any one of these gentlemen was guilty of any of the charges made. On the contrary, he was impressed on all occasions with their sincere desire to carry out the fishery laws in keeping with their instructions, with their grasp of the fishery situation, in their desire to be fair, and their never-failing object to preserve the fishing industry in British Columbia for all time.

INDIANS

Each season, with the increased amount of information received, it becomes more and more apparent that the depredations of the Indians on the spawning beds of the salmon has become so serious as to greatly endanger the supply of this variety of fish. In the Fraser River watershed, Indians or others are not permitted to take salmon above the Mission bridge and as far as it is possible this regulation is enforced. On the Skeena River watershed, however, the Indians are permitted to, for the purpose of their own winter's food, take from the spawning grounds what salmon are required. During the past fall many thousands of spawning sockeye salmon were destroyed which will result in a loss to the fishing industry impossible to estimate.

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In addition to the Babine Lake district Indians, during the season 1921, a large number of families from the Fraser River watershed came across to the Skeena and obtained their food supply and these Indians are making arrangements whereby a greatly increased number of families will repeat this operation next year.

In view of the immense value and importance of the sockeye salmon fishery and the present depleted condition of the runs, it is imperative that this practice be stopped at the earliest possible moment, otherwise all efforts at conservation will be of no avail. It is not reasonable to seriously hamper the fishing industry of the province by way of increased restrictions in fishing operations and permit the Indians to nullify all good results obtained thereby.

MEETINGS WITH INSPECTORS AND OVERSEERS

In the spring of 1921 the inspectors and overseers of the province were called to Vancouver for the first of what is intended to be the annual meeting of such officers with the chief inspector for the purpose of discussing fully the numerous fisheries problems of the several districts and for an exchange of ideas and advice which it is hoped will result in much greater efficiency in the service. There is no doubt that personal contact with the officers of the province results in a far better understanding of one another's problems and makes for a considerably increased esprit de corps and the betterment of the service generally.

CONFERENCE WITH STATE OF WASHINGTON FISHERIES BOARD RE: SALMON FISHERIES OF THE

FRASER RIVER AND PUGET SOUND

As long as twenty years ago it was apparent that the sockeye runs to the Fraser river would require increased conservation methods in order to preserve this enormously valuable natural resource. Owing to the fact, however, that the salmon ascending the Fraser river pass through the waters of Puget sound on the American side of the line, it was not possible to put into force any regulations which would curtail fishing operations on the Canadian side if similar steps were not taken in connection with the fishing on the American side of the line.

Commissions have been appointed and many meetings have been held for the purpose of arranging for some co-operation with the authorities to the south with a view to proper conservation methods being provided. Unfortunately up to date it has been impossible to obtain such co-operation and the result has been that the sockeye fishery of the Fraser has become so seriously depleted that the large packs taken in past years and which should be worth annually in the vicinity of thirty millions of dollars, have been reduced to a very small fraction of that amount.

It was hoped that the draft treaty recommended by the Canadian-American Commission of 1918 would have provided machinery which would permit of the proper handling of the situation. Unfortunately, although the treaty was signed by both the Canadian and American members of the commission and was tentatively approved by the Dominion Government, it was finally withdrawn from the American Senate, due to strenuous opposition from the State of Washington. This final action by the Senate was advised to this department during the present fall.

As soon as it became apparent that no help could be looked for in the way of the proposed treaty, steps were immediately taken to meet the newly appointed State of Washington Fisheries Board, in the hope that it would have sufficiently wide powers to co-operate with the Dominion Government and make possible an agreement whereby the salmon runs to the Fraser river could be restored and adequate conservation methods enforced.

A meeting was held in Vancouver on December 12 last. No agreement was reached as to the means of restoring the sockeye runs to the Fraser river, but an understanding was arrived at with respect to several other questions which came up at the conference.

OBSTRUCTIONS IN STREAMS, 1921

As a more intimate knowledge of the conditions obtaining on the spawning beds and in streams leading to spawning areas for salmon becomes available, the necessity for considerable attention being given each year to the clearing out of obstructions to the ascent of spawning fish becomes more apparent.

It will be appreciated that in the work of clearing obstructions in streams there are many difficulties with which the engineers have to contend. In the first place, experienced men are required and it is often difficult to obtain these for the short periods during which it is possible to operate.

Owing to many of these obstructions being in very remote parts of the province, the lack of facilities for transporting men and supplies causes much loss of time and makes the work very hazardous. In many instances supplies have to be packed in on the backs of the men, as it is impossible to use horses or boats.

Another difficulty to be confronted is the fact that in most cases there are only certain months in the year when the weather and water conditions permit of obstructions being removed satisfactorily, and as these periods are very similar in most parts of the coast, the attention of the engineering staff is required at many localities at much the same time, rendering the very desirable personal attention very difficult and at times impossible.

The clearing of obstructions, survey of hatchery sites, building of fishways, wharves, preparing of plans and other related work has necessitated during the past season the employment of additional help in the engineer's office, and it is anticipated that as this most important work increases it will be necessary to provide permanent assistance in the way of an assistant who can attend to the drafting and office routine, both engineers being kept very busy attending personally to the outside work.

REVENUE

In comparing the total revenue of the province for the calendar year 1921 with that of 1920 it will be observed that the past season shows a reduction of approximately \$82,000. The following comparative statement covering the principal items on which revenue is collected is very eloquent:—

	1920	1921
Salmon gill-net..	\$ 47,650 00	\$ 47,790 00
Salmon drag-seine..	8,850 00	4,650 00
Salmon purse-seine..	46,800 00	18,600 00
Salmon cannery..	32,500 00	21,500 00
Salmon trap-net..	9,500 00	4,000 00
Salmon saltery..	600 00	1,700 00
Salmon trolling..	9,260 00	7,315 00
Tax on seine and trap-net caught salmon.. . .	31,474 74	17,988 16
Tax on canned salmon..	39,415 50	24,097 78
Herring purse-seine..	2,775 00	1,875 00
Crab..	445 00	485 00
Fines..	2,203 50	1,708 50
Sales..	3,296 47	1,186 03
Sundry licenses..	1,307 50	1,384 50
Totals..	\$236,077 71	\$154,279 97

It will be observed that practically all the reduction is due to the operations in connection with salmon fishing. Owing to the unfortunate condition of the salmon market as affecting pinks, chums, coho, and spring salmon and also to the fact that a great percentage of the first two varieties particularly are taken by means of seines, it was not anticipated that the revenue would be so great as that of last year. In fact at the first of the season it was anticipated that practically no pinks or chums would be canned apart from those which were taken by gill-nets while fishing for the sockeye variety. As the fishing season advanced, however, it

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was found that the market conditions were improving considerably. In addition most companies had on hand a stock of cans or tin plate which had been purchased at top prices and which they were desirous of salvaging as far as possible as prices of this supply were falling. This being the case, during the latter part of the season the fall varieties were fished to a greater extent than at first expected.

CO-OPERATION BY PROVINCIAL FISHERIES DEPARTMENT

It is with much pleasure that reference is made to the apparent desire of the Provincial Fisheries Department to co-operate with this one as far as possible for the benefit of the fishing industry of the province. Evidence of this spirit has been abundant during the past year and I particularly wish to testify to the assistance rendered by Mr. J. P. Babcock, the assistant to the commissioner at Victoria and who has at all times shown a willingness to assist by means of his personal, extensive, and valuable knowledge and experience of British Columbia conditions.

STAFF

In conclusion, I wish to express personal appreciation of the loyalty and efficiency of the staff of the British Columbia Fisheries Service. This is particularly gratifying during the first year of the writer's experience as chief administrative officer for the province.

INSPECTION OF SPAWNING AREAS

During the season 1921 the inspection of spawning areas was given particular attention and it is proposed to have this work performed with the greatest possible thoroughness each season.

The several fishery officers of the province are being specially coached with a view to obtaining the most reliable information possible and the results of the first season have been most satisfactory. The report in full which follows was prepared from data furnished by the inspectors, overseers, guardians and superintendents of hatcheries together with a certain amount obtained by the chief inspector of the province personally, who together with Mr. J. P. Babcock, the assistant to the Commissioner of Fisheries for the province of British Columbia, and Dr. C. H. Gilbert, of the University of Stanford, visited particular portions of the Fraser river watershed.

APPENDIX II.

FINANCIAL STATEMENT, FISHERIES, 1921-22

Vote No.	Services	Appropriation	Expenditure
237	Salaries and disbursements of fishery officers, Fisheries Patrol Service, Oyster Culture.....	\$ 754,000 00	\$ 708,438 72
238	Building fishways, etc.....	40,000 00	22,681 00
239	Legal and incidental expenses.....	4,000 00	1,581 82
240	Conservation and development of deep sea fisheries.....	25,000 000	18,128 79
241	Fisheries intelligence Bureau.....	5,000 00	1,819 84
242	Inspection of canned and pickled fish.....	15,000 00	14,999 69
243	Fish culture.....	365,000 00	362,636 93
244	Scientific investigations into fisheries.....	15,000 00	11,399 11
245	International Commission—Fraser River.....	10,000 00	
246	Marine Biological Board.....	42,000 00	42,000 00
		1,275,000 00	1,183,685 90
	Civil Government salaries.....	92,060 00	83,152 69
	Contingencies.....	25,000 00	23,923 91
	Fishing bounty.....	160,000 00	159,449 80
		1,552,060 00	1,450,212 30
367	Cost of living bonus.....		78,676 48
529	Reclassification arrears.....		4,774 66
	Superannuation Act, 1920, No. 4.....		4,756 66
	Gratuities <i>re</i> deceased officials.....		230 00
	Total net expenditure, 1921-22.....		1,538,650 10

REVENUE COLLECTED, 1921-22

Class	Licenses	Revenue Tax	Fines	Sales	Total collected	Amounts refunded	Net Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Licenses, etc.—							
Nova Scotia.....	10,758 44		1,646 01	455 94	12,860 39	20 00	12,840 39
Prince Edward Isld..	2,489 47		325 00	62 75	2,877 22	2 00	2,875 22
New Brunswick.....	13,781 80		1,539 00	748 65	16,069 45	30 00	16,039 45
Quebec.....	13,972 93		250 00	134 46	14,357 39		14,357 39
Ontario.....			30 00	851 30	881 30		881 30
Manitoba.....	8,451 50		541 00	297 31	9,289 81		9,289 81
Alberta.....	9,899 00		142 00	78 30	10,119 30		10,119 30
Saskatchewan.....	2,633 00		256 00	585 31	3,474 31		3,474 31
British Columbia....	120,313 96	29,869 07	1,643 50	2,677 80	154,504 33	600 00	153,904 33
Yukon.....	375 00				375 00		375 00
Totals.....	182,675 10	29,869 07	6,372 51	5,891 82	224,808 50	652 00	224,156 50
Casual.....							5,451 20
Fish culture.....							6,066 05
Revenue under Pelagic Sealing Treaty.....							86,080 62
Premiums on exchange							7,146 37
Total net revenue collected, 1921-22.....							328,900 74

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DETAILED STATEMENT OF SALARIES AND DISBURSEMENTS OF FISHERY OFFICERS
EXPENDITURE FOR FISCAL YEAR 1921-22

Districts	Officers			Guardians			Miscellaneous	Totals
	Salaries	Disbursements		Wages	Expenses			
		\$	cts.		\$	cts.		
<i>Eastern Division—</i>								
Halifax office.....	12,899 00	1,340 91				856 04	15,095 95	
Nova Scotia No. 1.....	11,250 48	6,591 15	12,910 50	48 37		227 91	31,028 41	
“ No. 2.....	14,557 90	6,899 31	3,870 92	309 90		235 38	25,873 41	
“ No. 3.....	16,333 06	8,386 62	4,484 91			154 01	29,358 60	
<i>New Brunswick</i>								
No. 1.....	8,219 00	4,684 33	3,893 00	179 26		229 90	17,205 49	
“ No. 2.....	14,962 90	7,629 66	9,065 48			193 79	31,851 83	
“ No. 3.....	5,794 09	2,271 41	6,939 60			93 27	15,098 37	
<i>Prince Edward Island</i>								
Totals.....	7,434 99	3,320 64	605 00	24 13		139 08	101,356 37	
<i>Quebec</i>								
Totals.....	91,451 42	41,124 03	41,769 41	561 66		2,129 38	177,035 90	
<i>Central Division—</i>								
Winnipeg office.....	11,465 79	6,574 32	1,134 05	329 31		9 01	19,902 48	
Manitoba.....	3,180 00	1,021 34					4,244 57	
Saskatchewan.....	6,285 62	3,067 49	215 16	229 20		43 25	9,858 09	
Alberta.....	10,437 66	4,235 87	215 00	407 30		61 20	15,330 53	
Totals.....	7,695 83	4,366 14	122 50	262 75		26 70	12,473 92	
<i>British Columbia Division—</i>								
Vancouver office.....	27,599 11	12,690 84	552 66	899 25		165 85	41,907 71	
British Columbia No. 1.....	16,617 90	1,550 80						
“ No. 2.....	11,342 67	6,593 45	2,558 03	877 95		3,250 10	21,418 80	
“ No. 3.....	12,247 93	2,958 93	2,049 52	522 90		554 51	21,926 61	
Totals.....	14,340 00	4,736 25	7,432 59	1,657 41		684 76	18,464 04	
<i>General Account</i>	54,548 50	15,839 43	12,040 14	3,058 26		103 55	28,269 80	
Totals.....	385 00					4,592 92	90,079 25	
General Account.....								25,469 27
SUMMARY								
<i>Eastern Division</i>	91,451 42	41,124 03	41,769 41	561 66		2,129 38	177,035 90	
Quebec.....	11,465 79	6,574 32	1,134 05	329 31		399 01	19,902 48	
Central Division.....	27,599 11	12,690 84	1,552 66	899 25		165 85	41,907 71	
British Columbia Division.....	54,548 50	15,839 43	12,040 14	3,058 26		4,592 92	90,079 25	
General Account.....	385 00					25,084 27	25,469 27	
Totals.....	185,449 82	76,228 62	55,496 26	4,848 48		32,371 43	354,394 61	

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Departmental Boats—									
Anina.....	887 10	291 24	25 90	7 75	11 00	34 00	369 89		
Black Raven.....	2,359 16	1,212 94	57 73	77 66	53 37	76 31	2,733 71		
Bonila.....	827 26	1,414 41	43 78	229 63	85 95	136 77	4,418 60		
Babine No. 1.....	886 29		9 75	6 05	5 00	13 95	962 01		
Babine No. 2.....	868 03		35 50		6 00		951 64		
Cohoe.....	1,043 45		114 57		105 36	112 08	1,901 81		
Egret.....	3,662 82		92 98		37 86	17 20	1,677 43		
Elk.....	5,812 29		57 07		3 61	84 35	3,867 52		
Fispa.....	4,270 36		2,277 50		131 04	980 94	19,840 99		
Foam.....	27,663 21		820 44		437 51	392 53	3,950 92		
Givenchy.....	1,409 24		1,306 67		22 14	0 55	100,808 02		
Gull.....	1,610 00		2,332 99		2,088 47	114 90	2,574 27		
Hawk.....	1,830 43		11,961 18		95 32	101 84	2,334 89		
Heron.....	590 33		17 92		80 97	11 80	2,804 39		
Humming Bird.....	1,264 39		19 95		76 19	3 20	2,92 02		
Kayak.....	5,167 19		17 00		125 08	19 26	1,576 74		
Linnet.....	1,436 09		25 31		4 50	89 63	1,972 98		
Marfish.....	1,194 51		56 01		16 97	1,074 61	18,144 31		
Merlin.....	4,650 00		28 96		30 59	149 02	1,616 81		
Merry Sea.....	27 50		5,047 15		279 17	36 16	6,779 55		
Parrigan.....	5,040 00		1 50		29 45	152 30	775 57		
Swan.....	1,880 32		249 13		25 51	200 81	5,389 63		
Semiahmo.....	933 16		249 01		10 81	11 80	2,299 23		
Akashi.....	805 00		89 26		63 43	9 11	189,842 93		
Charlotte.....	480 00		92 66						
Dustie.....	480 00								
Ethelda.....									
Frisbie.....									
Grayling.....									
Kia Quack.....									
Lamaas.....									
Nellie B.....									
Nora.....									
Nortonian.....									
Owl.....									
Oyashimo.....									
M.....									
Regal.....									
Sophann.....									
Starston.....									
Saginaw.....									
Takosh.....									
Wolverine.....									
Totals.....	90,957 39	9,740 59	33,192 25	17,375 39	11,190 28	5,922 27	6,090 93	2,474 24	126 62
General Account.....									
* Salvage in Miscellaneous, \$31,410 80.									

189,842 93

EXPENDITURE FOR FISCAL YEAR 1921-22—Continued
SUMMARY

Vessels	Pay list	Board or Provisions	Fuel	Repairs		Supplies		Clothing	Miscellaneous	Totals
	\$ cts.	\$ cts.	\$ cts.	Hull	Engine	Engine	Deck			
Eastern Division.....	30,721 85	38 22	7,990 87	1,053 39	1,310 60	2,318 90	1,579 98	740 92	2,240 07	47,994 80
Quebec.....	15,589 86	6,075 72	13,393 23	4,496 30	2,896 32	1,702 74	1,420 46	963 32	3,409 37	49,947 22
Central Division.....	10,606 22	2,552 73	7,016 98	941 10	396 85	528 99	599 79	617 09	364 77	23,624 52
British Columbia Division.....	90,957 39	9,740 59	33,192 25	17,375 39	11,190 28	5,922 27	6,090 93	2,474 24	54,797 01	231,740 35
General Account.....									126 62	126 62
Totals.....	147,875 32	18,407 26	61,593 33	23,866 18	15,794 05	10,472 90	9,691 16	4,795 57	60,937 74	353,433 51

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DETAILED STATEMENT OF FISH CULTURE

EXPENDITURE, FISCAL YEAR 1921-22

Hatcheries	Salaries	Labour	Maintenance	Totals of Hatcheries	Totals of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia—</i>					
Bedford.....	1,000 00	105 00	1,928 75	3,033 75	
Isaac's Harbour.....		32 50		32 50	
Lindloff.....		68 92	610 70	679 62	
Margaree hatchery.....	3,405 00	521 30	2,351 80	6,278 10	
Margaree Pond.....		1,168 89	2,254 50	3,423 39	
Middleton.....	2,032 90	667 51	2,177 31	4,877 72	
Windsor.....	1,260 00	509 60	1,152 42	2,922 02	
Totals.....	7,697 90	3,073 72	10,475 48	21,247 10	21,247 10
<i>Prince Edward Island—</i>					
Kelly's Pond Hatchery.....	1,968 39	185 00	2,151 19	4,304 58	4,304 58
<i>New Brunswick—</i>					
Buctouche.....		10 00		10 00	
Grand Falls.....	2,130 00	662 80	2,773 68	5,566 48	
Miramichi Hatchery.....	2,820 00	157 50	1,283 88	4,261 38	
Miramichi Pond.....		1,559 75	2,491 93	4,051 68	
Nepisiguit.....		356 87	46 49	403 36	
New Mills Pond.....		1,863 77	4,008 93	5,872 70	
Restigouche.....	2,820 00	679 49	2,351 40	5,850 89	
Sparkle.....		380 59	159 90	540 49	
St. John Hatchery.....	1,581 45	2,257 04	3,779 20	7,617 69	
" Pond.....		2,422 50	7,880 61	10,303 11	
" Shad.....		26 00		26 00	
Tobique.....		199 02	268 82	467 84	
Totals.....	9,351 45	10,575 33	25,044 84	44,971 62	44,971 62
<i>Quebec—</i>					
Gaspé.....	2,700 00	3,076 73	3,301 65	9,078 38	
Tadoussac.....	1,500 00	4,319 63	3,854 18	9,673 81	
York Pond.....			20 00	20 00	
Totals.....	4,200 00	7,396 36	7,175 83	18,772 19	18,772 19
<i>Ontario—</i>					
Collingwood.....	3,645 00	2,190 57	7,001 89	12,837 46	
Kenora.....	2,993 57	4,480 25	4,560 08	12,033 90	
Kingsville.....	3,795 00	1,521 50	4,464 93	9,781 43	
Port Arthur.....	2,760 00	1,463 50	1,704 10	5,927 60	
Sarnia.....	3,558 75	2,367 50	5,302 03	11,228 28	
Southampton.....	2,247 58	1,287 49	2,467 60	6,002 67	
Thurlow.....	5,085 00	3,630 12	6,328 19	15,043 31	
Warton.....	3,960 00	1,370 35	2,218 37	7,548 72	
Totals.....	28,044 90	18,311 28	34,047 19	80,403 37	80,403 37
<i>Manitoba—</i>					
Dauphin River.....	1,810 16	4,801 23	3,212 01	9,823 40	
Dauphin River spawn camp.....		1,600 75	730 05	2,330 80	
Gull Harbour Hatchery.....	2,760 00	2,591 16	2,200 24	7,551 40	
Winnipegosis.....	1,889 76	6,509 39	5,745 94	14,145 09	
Totals.....	6,459 92	15,502 53	11,888 24	33,850 69	33,850 69
<i>Alberta—</i>					
Banff.....	3,375 00	909 75	3,890 33	8,175 08	
Spray Lakes.....		1,347 50	433 75	1,781 25	
Totals.....	3,375 00	2,257 25	4,324 08	9,956 33	9,956 33
<i>Saskatchewan—</i>					
Qu'Appelle.....	1,330 00	2,446 51	2,380 49	6,157 00	6,157 00

EXPENDITURE, FISCAL YEAR 1921-22—Continued

Hatcheries	Salaries	Labour	Maintenance	Totals of Hatcheries	Totals of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>British Columbia—</i>					
General account.....	6,310 00	172 17	11,148 02	17,630 19	
Anderson Lake.....	1,560 00	2,556 38	3,771 35	7,887 73	
Babine.....	1,430 00	2,964 48	5,373 15	9,767 63	
Cowichan.....	1,560 00	2,934 40	2,261 89	6,756 29	
Cultus.....	709 33	1,818 10	2,121 42	4,648 85	
Gerrard.....	375 00	1,555 79	1,497 99	3,428 78	
Harrison.....	1,680 00	4,307 05	8,708 42	14,695 47	
Kennedy.....	1,442 67	2,170 15	3,757 87	7,370 69	
New Westminster.....	662 90	1,156 84	1,956 33	3,776 07	
Pemberton.....	1,680 00	727 33	11,249 45	13,656 78	
Pitt.....	1,000 00	1,703 04	1,781 85	4,484 89	
Rivers Inlet.....	1,320 00	5,962 45	8,081 99	15,364 44	
Skeena River.....	1,946 45	6,252 74	8,642 36	16,841 55	
Stuart Lake.....	1,440 00	2,931 77	3,947 58	8,319 35	
Totals.....	23,116 35	37,212 69	74,299 67	134,628 71	134,628 71
General Account.....	4,020 00	50 00	4,275 34	8,345 34	8,345 34

SUMMARY

Nova Scotia.....	7,697 90	3,073 72	10,475 48	21,247 10	21,247 10
Prince Edward Island.....	1,968 39	185 00	2,151 19	4,304 58	4,304 58
New Brunswick.....	9,351 45	10,575 33	25,044 84	44,971 62	44,971 62
Quebec.....	4,200 00	7,396 36	7,175 83	18,772 19	18,772 19
Ontario.....	28,044 90	18,311 28	34,047 19	80,403 37	80,403 37
Manitoba.....	6,459 92	15,502 53	11,888 24	33,850 69	33,850 69
Alberta.....	3,375 00	2,257 25	4,324 08	9,956 33	9,956 33
Saskatchewan.....	1,330 00	2,446 51	2,380 49	6,157 00	6,157 00
British Columbia.....	23,116 35	37,212 69	74,299 67	134,628 71	134,628 71
General Account.....	4,020 00	50 00	4,275 34	8,345 34	8,345 34
Totals.....	89,563 91	97,010 67	176,062 35	362,636 93	362,636 93

SUMMARY STATEMENT OF FISHERIES EXPENDITURE BY PROVINCES

FOR FISCAL YEAR 1921-22

Services	Nova Scotia		Prince Edward Island		New Brunswick		Quebec		Ontario		Manitoba		Alberta		Saskatchewan		British Columbia		Yukon		General Account		Totals	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
Salaries and disbursements of F. O.	101,356	37	11,523	84	64,155	69	19,902	48	19,902	48	14,103	26	12,473	92	15,330	53	90,079	25	25,469	27	354,394	61	354,394	61
Fisheries Patrol Service.	25,150	85	5,609	52	17,234	43	49,947	22	49,947	22	23,624	52	23,140	35	231,740	35	231,740	35	126	62	353,433	51	353,433	51
Oyster culture.	2,387	93	601	60	26	31									20,263	52	20,263	52	3	24	610	60	610	60
Building fishways.	2,659	72	10	12	25	39	326	40			355	69			204	50	204	50			22,681	00	22,681	00
Legal and incidental expenses.																					1,581	82	1,581	82
Conservation and development of deep sea fisheries.	70	38	47	25			125	55							12,701	64	12,701	64	5,183	97	18,128	79	18,128	79
Fisheries Intelligence Bureau.	848	37			332	88	315	55											322	74	1,819	84	1,819	84
Inspection of canned and pickled fish.	6,619	73	1,287	31	3,011	58	3,145	13											358	89	14,909	69	14,909	69
Fish culture.	21,247	10	4,304	58	44,971	62	18,772	19	80,403	37	33,850	69	9,956	33	6,157	00	134,628	71	8,345	34	362,636	93	362,636	93
Scientific investigations into fisheries.	578	75	1,951	05	1,961	25													771	39	11,399	11	11,399	11
Fishing bounty.	91,410	20	9,413	00	14,640	60	43,986	00													159,449	80	159,449	80
Totals.	250,329	40	34,757	27	146,059	75	136,520	82	80,403	37	71,934	16	22,430	25	21,487	53	496,631	69	40,581	46	1,301,135	70	1,301,135	70
Marine Biological board.																					42,000	00	42,000	00
Civil Government salaries.																					83,152	69	83,152	69
Contingencies.																					23,923	91	23,923	91
Cost of living bonus.																					1,450,212	30	1,450,212	30
Reclassification arrears.																					78,676	48	78,676	48
Superannuation Act, 1920, No. 4.																					4,774	66	4,774	66
Gratuities re deceased officials.																					4,756	66	4,756	66
																					230	00	230	00
																					1,538,650	10	1,538,650	10

APPENDIX No. III.

The following is a statement of the different kinds of licenses issued by the different Inspectors during the 1921-22 season:—

QUEBEC—J. E. BERNIER, Inspector

Kind of License—	Number issued.
Lobster packing.....	75 (5 cancelled)
Lobster extensions..... 18	
Lobster fishermen's.....	614 (2 cancelled)
Herring trap-net.....	29
Cod trap-net.....	264 (4 cancelled)
Salmon fishery.....	Nil.
Quebec fishery licenses.....	1,173 (41 cancelled and 11 free)
Receipt books..... 278	
	<hr/>
	2,155 (52 cancelled and 11 free)

PRINCE EDWARD ISLAND—S. T. GALLANT, Inspector

Lobster packing.....	166 (2 cancelled)
Lobster extensions..... 83	
Fish cannery.....	6
Quahaug fishery.....	1
Lobster fishermen's.....	1,448
Smelt gill-net.....	226
Smelt bag-net.....	220 (1 cancelled)
Oyster fishery.....	348
Scallop fishery licenses.....	1
Prince Edward Island trap-net.....	2
	<hr/>
	2,418 (3 cancelled)

NOVA SCOTIA, DISTRICT No. 1—A. G. McLEOD, Inspector

Lobster packing.....	51
Lobster extensions..... 25	
Fish cannery.....	3
Nova Scotia angling permits.....	11
Lobster fishermen's.....	1,944
Smelt gill-net.....	155
Smelt bag-net.....	29
Oyster fishery.....	89
Nova Scotia trap-net.....	38
	<hr/>
	2,320

NOVA SCOTIA, DISTRICT No. 2—D. H. SUTHERLAND, Inspector

Lobster packing.....	63
Lobster extensions..... 42	
Fish cannery.....	6
Scallop fishery.....	1
Nova Scotia drag-seine.....	169
Nova Scotia salmon net.....	20
Nova Scotia angling permits.....	20
Lobster fishermen's.....	2,802 (1 cancelled) no refund
Smelt gill-net.....	143
Smelt bag-net.....	201
Oyster fishery.....	136
Nova Scotia trap-net.....	117
Lobster pound licenses.....	1
Nova Scotia herring weir.....	20
Lobster pound certificates..... 181	
	<hr/>
	3,699 (1 cancelled)

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NOVA SCOTIA, DISTRICT No. 3—H. H. MARSHALL, Inspector

Kind of License—	Number issued
Lobster packing.....	40 (1 cancelled)
Lobster extensions.....	52
Fish cannery.....	7
Nova Scotia angling permits.....	326 (4 cancelled)
Lobster fishermen's.....	4,342
Smelt gill-net.....	107
Smelt bag-net.....	23 (1 cancelled)
Lobster pound licenses.....	9 (1 cancelled)
Lobster pound certificates.....	676 (1 cancelled)
Nova Scotia trap-net licenses.....	156 (2 cancelled)
Scallop fishery licenses.....	201
Nova Scotia herring weir licenses.....	75
Receipt books.....	Nil
	<hr/> 5,286 (9 cancelled)

NEW BRUNSWICK, DISTRICT No. 1—J. F. CALDER, Inspector

Lobster fishermen's.....	531
Fish cannery.....	8
New Brunswick salmon fishery.....	17
Smelt bag-net.....	Nil
Scallop fishery.....	5
New Brunswick special permits to dig soft-shell or long-neck clams.....	69
Lease of Dark Harbour, Grand Manan, N.B.....	1
New Brunswick Herring weir.....	530
Lobster pound licenses.....	7
Lobster pound certificates.....	420
	<hr/> 1,167

NEW BRUNSWICK, DISTRICT No. 2—R. CROCKER, Inspector

Lobster packing.....	174
Lobster extensions.....	51
Fish cannery.....	2
Quahaug fishery.....	109
Lobster fishermen's.....	1,513
New Brunswick salmon fishery.....	395
New Brunswick bass gill-net.....	38
Smelt gill-net.....	189
Smelt bag-net.....	2,799 (33 free)
Oyster fishery.....	660
New Brunswick Bass fishery licenses.....	139
New Brunswick Herring Weir fishery.....	1
Lobster pound licenses.....	2
Lobster pound certificates.....	135
Special oyster permits.....	90
	<hr/> 6,111 (33 free)

NEW BRUNSWICK, DISTRICT No. 3—H. E. HARRISON, Inspector

New Brunswick sturgeon fishery.....	4
New Brunswick whitefish fishery.....	20 (2 cancelled)
New Brunswick Salmon net permits.....	83
New Brunswick salmon fishery.....	107 (2 cancelled) no refund
Smelt gill-net.....	2
Smelt bag-net.....	Nil
New Brunswick Bass fishery.....	25
	<hr/> 241 (2 cancelled)

MANITOBA—J. B. SKAPTASON, Inspector

Manitoba special fishery.....	1,499 (1 cancelled)
Manitoba settler's permits.....	922
Manitoba commercial sturgeon.....	88
Manitoba domestic sturgeon.....	10
Manitoba special angling permits for non-residents.....	19 (1 cancelled)
Receipt books.....	1,596 (4 cancelled)
	<hr/> 2,538 (2 cancelled)

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SASKATCHEWAN—G. C. MACDONALD, Inspector

Kind of License—	Number issued
Domestic sturgeon.....	7
Commercial sturgeon.....	10
Saskatchewan Domestic fishery.....	92
Saskatchewan commercial and fishermen's licenses.....	477
Saskatchewan Indian and half-breed permits.....	573
Receipt books.....	586
	<hr/> 1,159

ALBERTA—A. G. WILLSON, Inspector

Fish cannery.....	1	
Angling permits.....	3,266	(7 cancelled and 6 free)
Alberta domestic fishery.....	135	(16 cancelled)
Alberta commercial and fishermen's.....	636	(1 cancelled)
Alberta Indian and Half-Breed permits.....	195	
Receipt books.....	770	
	<hr/> 4,233	(24 cancelled and 6 free)

BRITISH COLUMBIA—J. A. MOTHERWELL, Inspector

Fish cannery.....	13	(4 cancelled)
British Columbia angling permits.....	51	
British Columbia Indian permits.....	106	(1 cancelled)
Abalone fishery.....	2	
Crab fishery licenses.....	159	(1 cancelled)
Smelt or sardine fishery.....	67	
British Columbia gill-net, drift-net or drag-seine licenses operated in conjunction with power boats.....	426	
British Columbia herring or pilchard gill-net or drift-net.....	57	
British Columbia herring drag-seine.....	1	
British Columbia herring purse-seine.....	27	
Herring drag-seine or purse-seine for halibut fishing vessels.....	Nil	
British Columbia sturgeon fishery licenses.....	5	
British Columbia trolling licenses.....	1,495	(30 cancelled)
British Columbia salmon gill-net or drift-net.....	4,779	(1 cancelled) no refund
British Columbia salmon trap-net license.....	8	
Salmon purse-seine license.....	66	(7 cancelled)
License to a captain of a salmon purse-seine boat.....	47	
British Columbia salmon drag-seine.....	35	(1 cancelled)
Salmon cannery licenses.....	56	
British Columbia salmon curing licenses.....	38	(4 cancelled)
Boat licenses for buy fresh salmon from fishermen.....	222	
License to a person engaged in cold storage or fish packing to buy fresh salmon from fishermen.....	102	(2 cancelled)
British Columbia reduction works licenses.....	7	
Whale factory licenses.....	3	
	<hr/> 7,772	(51 cancelled)

YUKON TERRITORY

Yukon special fishery.....	30	(3 cancelled)
Total number issued.....	<hr/> 39,129	(149 cancelled and 50 free)

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The following is a statement showing the number of prosecutions, confiscations and sales which took place in each province, during the 1921-22 season:—

Province	No. of Prosecutions	Revenue received	No. of Confiscations	Revenue from Sales
		\$ cts.		\$ cts.
Ontario (fines).....	3	30 00	.....	851 30
Quebec.....	23	250 00	19	134 46
Prince Edward Island.....	34	325 00	14	62 75
Nova Scotia—				
District No. 1.....	8	66 00	20	19 50
District No. 2.....	99	1,239 00	77	402 62
District No. 3.....	40	321 01	30	33 82
New Brunswick—				
District No. 1.....	19	232 00	57	
District No. 2.....	27	342 00	165	524 10
District No. 3.....	49	965 00	36	224 55
Manitoba.....	54	541 00	114	297 31
Alberta.....	27	142 00	20	78 30
Saskatchewan.....	37	256 00	49	585 31
British Columbia—				
District No. 1.....	59	903 50	29	2,195 91
District No. 2.....	59	545 00	49	303 09
District No. 3.....	20	195 00	20	178 80
Yukon Territory.....	Nil	.....	Nil	
Total.....	558	6,352 51	699	5,891 82

APPENDIX No. IV.

LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1921.

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for Entry	Quantity of Fish landed
					cwt.
Acushla.....	70	23	3	Shelter, bait.....	
Adeline.....	54	20	3	Shelter.....	
A. D. Willard.....	23	8	1	".....	
Agnes.....	65	19	3	".....	
Albert W. Black.....	51	11	7	supplies.....	
Alice May.....	11	6	6	".....	
Alice Wilson.....	16	7	2	".....	
A. M. Doughty.....	15	9	3	".....	
American.....	93	22	2	".....	
Anastasia E.....	16	7	1	".....	
Angeline C. Nunan.....	58	19	7	".....	
Angie B. Watson.....	36	17	8	".....	
Arthur James.....	95	19	1	".....	
Audrey & Theo.....	15	7	1	".....	
Aviator.....	210	34	3	supplies.....	
Bay State.....	81	25	6	Landing fish, supplies.....	63
Benjamin A. Smith.....	75	25	14	Supplies, shelter, bait.....	
Benjamin W. Wallace.....	49	19	2	Shelter.....	
Bettina.....	66	17	1	".....	
Catharine.....	77	27	6	Landing fish, supplies.....	61
Catharine Burke.....	68	20	10	Shelter.....	
Cavalier.....	96	22	11	Supplies, bait.....	
Commonwealth.....	93	24	8	Shelter.....	
Constellation.....	89	19	16	".....	
Corinthian.....	97	25	8	supplies.....	
Dawn.....	79	23	4	".....	
Desire.....	21	10	2	".....	
E. A. Burns.....	14	6	2	landing fish.....	7
Edith Silveria.....	47	20	3	".....	
Edith H. Cooney.....	12	6	6	".....	
Edith C. Rose.....	70	21	3	landing fish, supplies.....	5
E. H. M. Burns.....	18	8	1	".....	
E. H. Mildred.....	41	10	1	".....	
Eleanor.....	36	9	2	".....	
Elizabeth A.....	34	8	5	".....	
Eliza A. Benner.....	14	6	2	Supplies.....	
Elizabeth M. King.....	13	8	6	Shelter.....	
Elizabeth W. Nunan.....	48	17	15	supplies.....	
Elk.....	66	21	4	".....	
Elmer E. Gray.....	71	21	4	".....	
Elsie.....	93	25	7	".....	
Elsie G. Silva.....	50	20	15	supplies.....	442
Elva L. Spurling.....	49	19	4	".....	
Ella and Mildred.....	41	10	1	Supplies.....	
Ellen T. Marshall.....	75	22	13	".....	
Emelia D.....	10	6	6	bait, landing fish.....	173
Emerald.....	5	5	1	shelter, landing fish.....	9
E. M. King.....	13	8	4	Shelter.....	
Esperanto.....	91	25	4	".....	
Ethel.....	14	7	8	".....	
Etta M. Burns.....	18	8	5	".....	
Etta Mildred.....	41	15	3	supplies.....	
Evelyn and Ralph.....	38	9	1	".....	
Evelyn and Ralph.....	16	9	6	supplies.....	
Fannie E. Prescott.....	74	23	14	supplies, bait, landing fish...	192
Flora L. Oliver.....	59	23	10	supplies, landing fish.....	83
Frances Lenor.....	12	5	1	".....	
Frances S. Grueby.....	94	25	5	".....	
Funchal.....	20	8	3	".....	
Genesta.....	53	20	2	".....	

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LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity of Fish landed
					cwt.
Gladiator.....	75	6	1	Supplies.....	
Good Luck.....	55	19	20	" shelter, landing fish.....	1
Governor Marshall.....	60	21	1	Shelter.....	
Harmony.....	66	18	9	" bait, supplies.....	
Harvard.....	72	19	1	"	
Hazel Jackson.....	26	8	2	"	
Helena.....	40	17	1	"	
Helja Silva.....	77	21	2	Supplies.....	
H. E. Murley.....	5	5	4	Shelter.....	
Henrietta.....	62	17	13	" bait, supplies.....	
Herbert Parker.....	78	21	14	Supplies, landing fish.....	1
Hesperus.....	79	25	1	Shelter.....	
Higco.....	12	6	6	"	
Hortense.....	43	19	5	" bait, supplies.....	
Ingomar.....	85	23	31	" supplies.....	
Imperator.....	79	23	11	" " landing fish.....	16
James R. Clark.....	36	18	5	"	
Jeanette.....	51	19	8	" bait.....	
Joffre.....	80	25	7	" bait, supplies.....	
John A. Casey.....	14	8	1	"	
John A. Cooney.....	14	8	4	" supplies.....	
John J. Fallon.....	60	19	5	" landing fish.....	49
Joseph Warner.....	11	6	7	" supplies.....	
Judique.....	89	8	1	"	
Killamey.....	73	23	11	Supplies, shelter.....	
Lafayette.....	12	8	5	Shelter.....	
L. A. Dunton.....	94	23	6	" supplies.....	
Laura Goulart.....	73	21	3	"	
Lizzie A.....	33	7	1	"	
Lochinvar.....	34	9	4	" supplies.....	
Lois H. Corkum.....	34	12	4	" landing fish.....	662
Louisa B. Marshall.....	74	21	3	" supplies.....	
Louisa R. Sylva.....	92	23	10	" " bait.....	
Lucia.....	43	19	14	" landing fish.....	1
Mabel E. Bryson.....	23	7	1	"	
Malicia Enos.....	8	5	5	"	
Margaret.....	72	18	4	" supplies.....	
Marion McLoon.....	11	7	9	" " landing fish.....	52
Marsala.....	46	18	1	"	
Marshall Foch.....	64	23	8	Supplies, bait, landing fish.....	14
Mary E. Harty.....	77	19	1	Shelter.....	
Mary F. Curtis.....	65	23	4	"	
Mary T. Fallon.....	48	15	3	" supplies.....	
Mayflower.....	113	25	14	" bait, supplies, landing fish.....	73
Medric.....	189	21	1	"	
Mildred Robinson.....	73	21	14	" supplies, landing fish.....	217
Minerva.....	13	6	9	"	
Monarch.....	83	23	10	" " bait.....	
Morning Star.....	85	22	5	Supplies, landing fish.....	114
Motor.....	17	9	4	"	
Natalie.....	13	6	4	Shelter.....	
Natalie Hammond.....	51	21	4	"	
Nickerson.....	9	6	2	"	
Nirvana.....	50	12	2	"	
Nyoda.....	28	12	2	" landing fish.....	207
On Time.....	12	5	1	"	
Oretha F. Spinney.....	87	24	7	Bait, supplies, landing fish.....	197
Orion.....	39	15	2	Shelter.....	
Philip P. Manta.....	43	18	2	"	
Pilot.....	18	8	2	" supplies.....	
Pioneer.....	84	19	5	"	
Pioneer.....	53	19	4	Supplies, shelter.....	
Pollyanna.....	66	19	1	Shelter.....	
Ralph Brown.....	67	19	2	Bait, supplies.....	
Reliance.....	22	9	1	Shelter.....	
Reliance.....	9	4	4	"	
Restless.....	15	8	4	"	
Republic.....	48	19	4	Supplies, bait.....	

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LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity of Fish landed
Reveira.....	23	9	1	Shelter.....	cwt.
Rex.....	75	23	12	" supplies, bait.....	
Rhodora.....	70	19	3	" bait.....	
Robert and Arthur.....	67	21	2	"	
Ruth.....	49	18	2	"	
Ruth and Margaret.....	77	23	4	" supplies.....	
Sadie M. Nunan.....	36	21	9	"	
Satellite.....	4	3	1	"	
Squanto.....	81	19	18	" supplies, landing fish.....	1,350
Stiletto.....	91	19	4	"	
Stranger.....	26	8	4	"	
Sunapee.....	18	8	2	"	
Thelma.....	28	12	6	"	
Thos. S. Gorton.....	92	22	2	" supplies.....	
T. M. Nicholson.....	90	9	1	"	
Undercliff.....	47	8	4	" supplies.....	
Vagrant.....	9	7	3	"	
Victor.....	75	19	5	" supplies.....	
Vida McKeown.....	83	19	2	"	
Viking.....	34	16	9	"	
Waldo L. Stream.....	66	21	10	Supplies, bait, landing fish.....	77
Waltham.....	44	21	10	Shelter.....	
W. H. Reid.....	9	4	1	"	
Woiee.....	9	6	4	"	
Wesley W. Sennett.....	11	7	7	" supplies.....	
W. W. Smith.....	11	6	2	"	
Yankee.....	96	25	1	"	

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity of Fish landed
A. K.....	7	2	8	Shelter, bait.....	cwt.
Active.....	4	2	1	Supplies.....	
Actor.....	7	2	2	Landing fish.....	100
Adele.....	4	2	2	" supplies, bait.....	20
Adeline.....	6	2	1	"	580
Agnes.....	17	5	3	Bait, shelter.....	
Alaska.....	44	15	5	Landing fish, supplies, bait.....	2,780
Albatross.....	40	13	13	Shelter, supplies, bait, landing fish..	2,560
Albatross.....	16	5	1	Landing fish	1,800
Alf.....	28	6	1	"	140
Alfa.....	5	2	1	"	40
Alfa.....	12	5	4	" bait.....	240
Alice B.....	13	5	4	"	220
Almera.....	3	2	1	Supplies.....	
Alph.....	4	3	2	Landing fish, shelter.....	120
Alten.....	43	15	9	" supplies.....	4,280
America.....	25	11	11	Bait.....	
Annie.....	11	4	1	Landing fish.....	80
Anna J.....	22	5	5	Shelter, bait.....	
Anna J. Larsen.....	25	11	4	Bait.....	
Antler.....	22	5	14	Landing fish, bait.....	220
Apache.....	4	1	1	Shelter.....	
Arctic.....	29	4	1	Landing fish.....	2,960
Arcade.....	14	4	12	" bait.....	80
Ariel.....	7	2	1	Shelter.....	
Arthur.....	4	2	1	Landing fish	20
Astrea.....	4	2	1	Shelter.....	
Atlas.....	31	17	7	Landing fish, supplies, bait.....	1,680
Atlantic.....	25	11	10	" bait.....	260
Augusta.....	19	5	1	"	1,300

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LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed
					cwt.
Aurora.....	20	5	1	Bait.....	
Aurora.....	13	5	12	Landing fish, bait.....	140
Ava.....	3	2	1	Supplies.....	
Avona.....	9	4	1	Landing fish.....	120
Baldy.....	7	2	1	".....	23
Baltic.....	20	5	1	".....	1,160
Bartolome.....	4	3	1	".....	640
Beaver.....	17	5	1	".....	42
Beaver.....	9	4	7	" bait.....	280
Ben.....	8	3	1	Supplies.....	
Bernice.....	4	2	2	Landing fish.....	60
Billie M.....	14	4	1	Supplies.....	
Bill 2.....	4	2	1	".....	
Bravo.....	5	3	1	Landing fish.....	720
Bring Gold.....	12	4	2	" supplies.....	1,440
Brothers.....	13	5	2	".....	1,500
Bryan.....	15	4	1	".....	620
Buckeye.....	10	3	1	Shelter.....	
Bucky.....	4	1	1	".....	
C. & B. 673.....	4	2	1	Supplies.....	
California.....	20	5	6	" landing fish, bait.....	900
Cape Clear.....	13	4	7	".....	680
Cape Spencer.....	11	3	1	Landing fish.....	240
Caroline.....	18	5	1	".....	740
Castle.....	4	2	1	Shelter.....	
Castor.....	6	2	2	Landing fish.....	80
Cedric.....	19	3	1	".....	80
Chancellor.....	13	4	3	" supplies.....	2,160
Chimera.....	9	4	12	" bait.....	1,020
Christine.....	4	2	2	".....	240
Christiana.....	4	2	1	".....	40
Circle H.....	4	2	1	".....	20
Clara.....	6	3	1	".....	220
Clara.....	4	2	1	".....	200
Columbia.....	32	4	1	".....	40
Comet.....	5	2	1	Supplies.....	180
Commonwealth.....	60	17	3	" landing fish.....	4,540
Companion.....	9	2	5	Shelter.....	
Confidence.....	22	4	1	Landing fish.....	1,680
Constitution.....	39	13	14	Bait.....	
Convention.....	20	5	8	Bait, supplies, shelter, landing fish..	1,120
Cora.....	4	2	1	Landing fish.....	480
Corona.....	19	5	2	".....	1,580
Coyote.....	4	2	1	Shelter.....	
Crescent.....	8	4	2	Landing fish, supplies.....	860
Daily.....	26	6	4	" bait, supplies.....	1,340
Daisy.....	18	6	3	".....	1,600
Dall 2.....	4	2	1	Shelter.....	
Decision.....	13	5	1	".....	
Defence.....	20	8	7	Landing fish, supplies, bait.....	1,160
Defiance.....	20	5	2	Bait.....	
Delaware.....	8	3	1	Landing fish.....	180
Democrat.....	27	6	3	".....	2,320
Dependent.....	5	4	1	".....	60
Diamond T.....	8	2	1	".....	1,020
Dick.....	10	5	9	" bait.....	80
Dip.....	4	2	6	" supplies.....	100
Director.....	12	5	2	" supplies.....	1,040
Discovery.....	10	5	6	Supplies, bait.....	
Dolphin.....	7	2	1	Landing fish.....	180
Dora H.....	15	5	3	Bait.....	
Dorothy.....	11	2	1	Landing fish.....	240
Dot.....	3	2	1	Shelter.....	
Duck.....	4	1	2	Supplies.....	
Eagle.....	28	6	4	Landing fish, bait.....	6,660
Eagle.....	15	6	2	".....	480
Eagle.....	9	4	2	" supplies.....	1,220
Eagle.....	9	4	1	".....	700
Eastern Point.....	4	3	1	Bait.....	
Ed.....	3	2	4	".....	
Ed. 904 K.....	3	2	1	".....	

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LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed cwt.
Edna.....	6	2	1	Supplies.....	
Edna L.....	4	1	1	Shelter.....	
Eidsvold.....	15	5	6	Landing fish, bait.....	360
Elaine.....	6	3	1	".....	60
Eleanor.....	16	5	5	Bait.....	
Eleanor D.....	8	2	1	Supplies.....	
Elfin.....	4	2	1	Landing fish.....	120
Eloise.....	8	2	1	".....	60
Elsie.....	5	2	3	" bait.....	20
Emblem.....	4	2	1	".....	220
Elsinore.....	23	3	1	".....	340
E. Neilson.....	15	4	1	".....	660
Evelyn.....	4	2	2	Shelter, supplies.....	
Evolution.....	17	5	11	Landing fish, bait.....	60
Fairway.....	19	5	3	" supplies.....	660
F. C. Hergert.....	15	13	15	" bait.....	300
Fighting Bob.....	3	2	3	" supplies.....	100
Fisher.....	14	5	1	".....	1,600
Fisher.....	8	1	1	".....	100
Flattery.....	10	3	1	".....	220
Flamingo.....	13	5	5	Bait, supplies.....	
Fliver.....	5	1	1	Shelter.....	
Flo.....	4	1	1	".....	
Florence.....	38	11	7	Landing fish, bait.....	620
Fortuna.....	21	5	3	".....	360
Forward.....	18	5	5	".....	1,420
Fram.....	4	2	2	" supplies.....	240
Get the Hook.....	10	2	1	".....	100
Glacier.....	12	4	1	".....	500
Gladstone.....	23	6	1	".....	840
Gony.....	12	5	6	" supplies, bait.....	300
Golden North.....	19	5	1	".....	160
Grant.....	5	2	2	".....	160
Grayling.....	15	5	11	" bait.....	880
Groth.....	7	3	9	" supplies.....	260
H. & R.....	4	3	1	Landing fish.....	700
Hanna.....	11	5	4	Supplies, bait.....	
Happy.....	12	4	1	Landing fish.....	700
Harding.....	19	5	7	Bait.....	
Harvester.....	15	5	4	Landing fish, supplies.....	240
Harry.....	7	2	1	Shelter.....	
Hazel.....	24	5	1	Bait.....	
Hazel.....	7	4	2	" landing fish.....	280
Helen A.....	8	3	1	Landing fish.....	120
Helen D.....	8	3	2	".....	320
Helena.....	15	4	1	".....	320
Helgeland.....	56	15	2	" Bait.....	3,020
Hicks.....	7	2	1	Supplies.....	
Hilda.....	10	3	2	Landing fish.....	680
Hi Gill.....	6	4	1	".....	820
Holdal No. 2.....	4	4	1	".....	720
Hope.....	7	2	2	".....	29
If. 2.....	4	1	1	Shelter.....	
Igloo.....	11	1	1	Landing fish.....	260
Imperial.....	19	5	15	" bait.....	140
Inverness.....	16	8	1	".....	160
Irene.....	8	3	1	Bait.....	
Iris.....	9	3	1	Landing fish.....	20
Jean.....	9	2	1	Supplies.....	
Jeannette.....	6	2	3	" Landing fish, bait.....	260
Jennie.....	16	3	2	Shelter.....	
Jennie F. Decker.....	16	8	17	Landing fish, bait.....	640
Johanna.....	16	5	2	" supplies.....	740
J. P. Todd No. 1.....	4	2	1	".....	340
J. P. Todd No. 2.....	12	5	2	" supplies.....	680
June.....	15	4	2	".....	1,020
June.....	7	1	1	".....	40
June.....	4	1	1	".....	20
K. 736.....	4	2	1	Landing fish.....	40

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LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed
					cwt.
Katella.....	16	5	3	Bait.....	
Kayak.....	8	3	9	".....	
Kaydee.....	5	2	1	Supplies.....	300
Kennebec.....	4	3	1	Landing fish.....	3,040
King & Wing.....	97	19	3	" " bait.....	4,300
Kodiak.....	38	13	19	Landing fish.....	4
681 L.....	2	1	1	".....	580
Lansing.....	16	5	1	" bait, supplies.....	1,160
La Paloma.....	14	11	24	" supplies.....	380
Laura.....	7	3	2	" bait.....	260
Lebanon.....	14	5	10	".....	780
Lenore.....	14	4	1	Shelter.....	
Leonine.....	24	5	1	Landing fish, bait.....	2,240
Liberty.....	44	15	8	".....	980
Lief No. 2.....	21	4	1	" bait.....	1,240
Lincoln.....	23	5	13	".....	320
Lincoln.....	4	3	1	Bait.....	
Louise.....	16	5	10	Landing fish.....	540
Lovera.....	4	2	1	".....	780
Lummen.....	10	4	1	Landing fish.....	440
Mackerel.....	8	2	1	Bait.....	
Madeline J.....	21	5	2	Landing fish, supplies.....	760
Mars.....	9	4	2	".....	47
Margaret.....	5	2	3	".....	220
Margaret No. 1.....	12	3	1	Bait.....	
Margaret T.....	10	4	2	" landing fish.....	380
Mary.....	16	8	17	Shelter.....	
Mary.....	5	3	1	".....	
Mary.....	3	1	1	Landing fish.....	12
Mary L.....	7	2	1	Supplies, bait.....	
Mermaid.....	19	5	13	Bait.....	
Mildred.....	19	8	14	" landing fish.....	60
Mildred No. 2.....	31	8	7	Shelter.....	
Mine.....	6	2	1	Bait.....	
Minnie Berna.....	10	4	1	Bait.....	
M. K.....	4	2	2	Supplies, bait.....	
Molde.....	7	3	9	Bait.....	240
Mongolia.....	25	4	1	Landing fish.....	580
Moringen.....	17	6	1	".....	320
Myra.....	4	3	1	" bait.....	240
Myrtle.....	9	4	8	".....	180
National.....	20	5	13	Landing fish, supplies, bait.....	3,700
New England.....	70	27	3	".....	880
New Zora.....	26	4	1	" supplies, bait.....	1,920
Nidaross.....	23	5	2	".....	220
Nomad.....	15	4	6	Bait.....	
Nootka.....	30	4	1	Landing fish.....	1,220
Norland.....	19	6	1	".....	800
Norma.....	6	3	1	Bait, shelter.....	
North.....	9	3	10	Landing fish.....	40
North Cape No. 2.....	4	3	1	".....	60
North Pole.....	4	2	1	".....	800
Nuzon.....	19	4	1	Bait.....	
Ocean.....	18	5	1	".....	
Ocean Wave.....	10	2	1	Landing fish.....	2,140
Olympic.....	30	11	1	".....	3,000
Omny.....	34	13	1	" supplies, bait.....	540
Onah.....	18	5	6	" ".....	2,660
Orient.....	48	13	13	Landing fish, bait.....	220
Pacific.....	26	11	16	Supplies.....	
Pal.....	4	2	1	" bait, landing fish.....	6,220
Panama.....	34	13	13	Landing fish.....	60
Pegge.....	4	4	1	" supplies.....	1,080
Pelican.....	17	5	2	Bait.....	
Pershing.....	18	5	14	Landing fish.....	660
Phoenix.....	15	2	1	".....	100
Pilot.....	9	3	1	".....	4,020
Pioneer.....	48	15	1	" bait.....	440
Pioneer No. 3.....	26	5	10		

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage in Crew	Number of Men	Number of times entered	Reasons for entry	Quantity of Fish landed
Pirate.....	20	4	1	Landing fish.....	cwt. 720
Polaris.....	45	15	6	" supplies.....	4,140
Portage.....	4	2	1	Shelter.....	
President.....	24	6	6	Landing fish, bait.....	220
Preslio.....	14	5	2	Bait.....	
Presto.....	14	5	1	Supplies.....	
Primrose.....	3	1	1	Bait.....	
Prospector.....	50	15	1	Landing fish.....	2,580
Progress.....	5	2	1	Shelter.....	
Puget.....	4	1	1	".....	
Queen.....	15	3	1	Landing fish.....	40
Queen.....	4	1	1	Shelter.....	
Rainier.....	4	3	1	Landing fish.....	460
Rambler.....	10	5	1	".....	140
Reform.....	4	3	1	".....	420
Regal.....	3	1	1	Shelter.....	
Reliance.....	14	4	1	Landing fish.....	1,260
Reliance No. 1.....	19	6	2	" supplies.....	1,840
Reliance.....	7	3	2	" ".....	1,040
Republic.....	51	16	7	" ".....	7,880
Rescue.....	6	3	1	".....	100
Restitution.....	24	5	4	" supplies, bait.....	700
Road.....	12	2	1	Supplies.....	
Road Amundsen.....	16	5	1	" landing fish.....	260
Roamer.....	5	2	1	Bait.....	
Rolf.....	10	4	1	Landing fish.....	900
Rolfe.....	3	1	4	Shelter, bait.....	
Rolph.....	6	3	1	Supplies.....	
Roosevelt.....	13	5	9	" bait, landing fish.....	240
Roasario.....	16	5	11	Landing fish, bait.....	300
Royal.....	15	5	1	Bait.....	
Ruth.....	5	2	1	".....	
Sadie K.....	13	5	1	Landing fish.....	420
Salmon.....	20	5	1	Shelter.....	
Sammy.....	8	3	9	Landing fish, supplies, bait.....	200
Samson.....	7	3	2	" ".....	980
Scandia.....	79	19	5	" " ".....	1,880
Scapp.....	11	2	2	Shelter, bait.....	
Scout.....	4	2	2	Landing fish, bait.....	40
Seabird.....	14	3	1	".....	260
Seattle.....	55	14	7	" supplies, bait.....	4,280
Sea Lion.....	6	2	1	".....	60
Selam.....	3	5	1	".....	3
Selca.....	18	3	1	".....	240
Senator.....	11	11	5	" supplies, bait.....	2,240
Sentinel.....	21	6	5	" bait.....	1,920
Service.....	37	7	1	Supplies.....	
Seymour.....	44	15	1	Landing fish.....	2,420
Sherman.....	18	5	1	".....	1,280
Signal.....	13	4	1	".....	420
Siloam.....	16	8	16	" supplies, bait.....	1,340
Silver Wave.....	12	3	1	".....	20
Sirius.....	17	2	1	".....	360
Sitka.....	50	15	1	".....	660
Speculator.....	9	3	4	" supplies.....	960
Spencer.....	17	5	2	" ".....	1,420
S. & S.....	4	3	1	".....	280
Stamsund.....	14	3	1	".....	1,580
Stanley.....	15	5	1	".....	280
Star.....	12	4	1	".....	1,600
Star.....	7	3	2	Supplies.....	
Stranger.....	6	2	1	Landing fish.....	80
Success.....	4	3	1	".....	200
Sumner.....	24	13	1	".....	920
Sun Wing.....	15	5	4	Supplies, bait.....	
Suomni.....	8	2	1	Landing fish.....	100
Superior.....	16	5	5	" bait.....	180
Swift.....	7	2	1	Bait.....	
Swiftsure.....	22	5	2	" landing fish.....	820

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LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage in Crew	Number of Men	Number of times entered	Reasons for entry	Quantity of Fish landed
					cwt.
T. 524.....	4	2	1	Landing fish	60
T. 802.....	4	3	1	"	40
T. 966.....	3	1	1	Shelter.....	
T. 981.....	4	1	1	Landing fish	20
Tahoma.....	18	11	4	" supplies, bait.....	980
Taku Jack.....	9	2	1	Shelter.....	
Tani.....	3	1	5	" landing fish, bait.....	5
Tatoosh.....	24	6	2	Landing fish, bait.....	1,880
Teddy J.....	13	4	1	"	1,560
Tell.....	4	2	1	"	60
Texas.....	16	5	9	" bait.....	140
Texas.....	4	2	1	Shelter.....	
Thelma M.....	7	2	1	Landing fish.....	200
Thelma No. 2.....	26	5	6	" supplies, bait.....	60
Thor.....	4	2	1	"	40
Tillicum.....	21	5	12	" bait.....	80
Tom and Al.....	57	15	6	" " supplies.....	6,400
Tordenskjold.....	39	19	10	" " "	3,280
Tremont.....	10	4	1	Bait.....	
Trio.....	19	5	5	Landing fish, supplies, bait.....	360
Tyce.....	12	4	3	" bait.....	1,120
Umatilla.....	8	3	3	Landing fish, bait.....	120
Unimak.....	10	3	1	"	180
Uranus.....	15	5	4	" bait.....	980
Valera.....	6	2	3	Shelter, supplies, bait.....	
Valid.....	8	3	5	Landing fish, supplies, bait.....	340
Valorous.....	21	4	1	Shelter.....	
Vansee.....	43	15	12	Landing fish, supplies, bait.....	3,160
Venus.....	4	3	1	"	600
Verna A.....	4	2	1	Shelter.....	
Vesta.....	13	4	3	Landing fish, supplies, bait.....	1,720
Victor.....	3	1	1	"	20
Viking.....	6	3	2	" supplies.....	1,300
Virginia.....	33	6	2	"	2,000
Vivian.....	9	4	1	"	380
Vivian.....	5	3	1	"	60
Volunteer.....	19	5	13	" bait.....	420
Wabash.....	6	3	1	Landing fish.....	100
Wabash.....	9	2	1	Shelter.....	
Wasa.....	24	11	5	Landing fish, supplies, bait.....	1,460
Washington.....	15	5	3	" bait.....	740
Wave.....	7	3	1	"	800
Ways.....	7	3	1	"	80
Westford.....	17	5	4	" bait.....	340
White Star.....	17	4	1	"	660
Wildwood.....	13	2	1	"	40
Wilhelmina.....	17	5	12	" bait.....	220
Wireless.....	19	5	16	" " supplies.....	240
Wilson.....	19	5	6	" "	380
Woodrow.....	23	5	9	" " supplies.....	440
Yakutat.....	41	13	18	Landing fish, supplies, bait.....	3,240
Yankee.....	10	3	1	"	80
Yellowstone.....	20	5	4	" supplies, bait.....	560
Yule.....	6	2	3	" "	60
Zebellos.....	10	5	1	Bait.....	
Zilla May.....	56	15	1	Landing fish.....	360
Zora.....	15	5	1	"	360

FIFTY-SIXTH
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1922

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,
G.C.M.G., M.V.O., Governor General and Commander in Chief of the
Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-sixth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

E. LAPOINTE,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, AUGUST, 1923.

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DEPUTY MINISTER'S REPORT

To the Honourable ERNEST LAPOINTE,
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Fifty-sixth Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1923.

The report deals with the following subjects:—

- Review of the Fisheries of 1922.
- Operation of the Fish Inspection Act.
- Operation of the Meat and Canned Foods Act.
- Fisheries Statistics.
- Bait Reporting Service.
- Scouting for Mackerel.
- British Columbia Fisheries Commission.
- Fishing Bounty.
- Fish Culture.
- Work of Biological Stations.
- Natural History Observations.
- International Committee on Deep Sea Investigations.

Appendices to the report include the following:—

- Reports of the Chief Inspectors of Fisheries.
- Fisheries Expenditure and Revenue.
- Summary of Licenses Issued.
- Entries of United States Fishing Vessels.

REVIEW OF THE FISHERIES OF 1922

The prosecution of the fisheries on the Atlantic and Pacific Coasts during 1922 was attended with greater success than in the preceding year. The aggregate catch was considerably higher. The results of operations on the inland lakes of Ontario and the West were, on the other hand, not quite so good as in the year before. The total marketed value of the fisheries of the whole of Canada for the year under review was nearly \$7,000,000 greater than that for 1921. The year 1921, however, was by much the poorest in value since 1914. Compared, therefore, with the value for 1920, that of 1922 is over \$7,000,000 less, while, if the results of the year under review are compared with those of the year preceding the great war, an increase of over \$8,000,000 will be found. The following table shows the contribution of the various provinces to the total value of the year being reviewed and of the year preceding it:—

	1922	1921
Nova Scotia.....	\$ 10,209,258	\$ 9,778,623
New Brunswick.....	4,635,660	3,690,726
Prince Edward Island.....	1,612,599	924,529
Quebec.....	2,089,414	1,815,284
Ontario.....	2,858,122	3,065,042
Manitoba.....	908,816	1,023,187
Saskatchewan.....	245,337	243,018
Alberta.....	331,239	408,868
British Columbia.....	18,849,658	13,593,670
Yukon Territory.....	10,107	28,988
	<u>\$ 41,800,210</u>	<u>\$ 34,931,925</u>

ATLANTIC FISHERIES

Cod, Haddock, Hake and Pollock.—The aggregate catch of these fish on the whole Atlantic coast of Canada amounted to 3,045,000 cwts. This is 536,000 cwts. greater than the catch in 1921 and 338,000 cwts. greater than that in 1920. The increase is due to cod mainly, the catch of which was over 300,000 cwts. greater. The haddock catch exceeded that of the preceding year by 38,000 cwts., while the catch of hake was greater by 60,000 cwts. and of pollock by 20,000 cwts.

Mackerel, Herring and Sardines.—Mackerel were very plentiful in the spring along the Nova Scotia coast and at the Magdalen islands. The catch in all the provinces was 100,000 cwts. greater than that of the preceding year. The increase in Nova Scotia amounted to 75,000 cwts., while in Quebec, principally at the Magdalen islands, there was an increase of 28,000 cwts.

The herring catch was greater by 130,000 cwts. The increase was nearly all attributable to New Brunswick, as a result of improved conditions in the smoked herring business of the Bay of Fundy.

The sardine fishery has recovered slowly from the disastrous effects of the over supplies which clogged the markets a few years ago. There was an increase in the catch of 90,000 barrels.

Other Sea Fish.—The quantity of halibut landed was about the same as in the preceding year, which gave 7,600 cwts. more than in 1920. The catch of swordfish in 1921 was more than double that in 1920, while in 1922 it was nearly double that in 1921. The landings of albacore and flounders were slightly greater than those for the preceding year, while the catch of tomcod was about 4,000 cwts. less.

Shell-fish.—The quantity of lobsters taken during the year 1922 was 30,000 cwts. less than the catch in 1921. While the catch in the aggregate was less, three of the provinces gave an increased production, Prince Edward Island's catch being over 20,000 cwts. greater. To the western part of Nova Scotia is due the decreased total landing of lobsters. There, fishing begins early in spring, and, as the weather was much rougher in the spring months of 1922 than in those of 1921, operations were interrupted to a greater extent. The smaller catch was no doubt partly due also to the special fishery season granted in the fall of 1921. If the 30,000 cwts. taken at that time had been left uncaught, the catch of 1922 would have been greater possibly to that extent.

The catch of oysters was about the same as that in the preceding year. The beds in Richmond Bay, Prince Edward Island, which for some years past had not been producing, are now recovering and giving promise of a return to their old fertility.

There was a substantial increase in the catch of clams.

Scallops were taken in much greater quantities. The catch amounted to 10,700 barrels against 4,800 barrels in the preceding year. While the old scallop beds yielded their usual quota, new beds were discovered, especially on the Bay of Fundy side of Digby neck, which were vigorously and successfully operated on.

River-Spawning Fish.—The salmon fishery as a whole was slightly better than in the preceding year, the catch for 1922 being 36,300 cwts. against 33,800 cwts. for 1921. There was an increase of about 5,000 cwts. in the combined catches of Nova Scotia and Quebec, while the New Brunswick catch on the other

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hand was less by about 3,300 cwts. The total quantity taken in 1922 is above the average of the three preceding years. It falls considerably below the average of the five years preceding 1919 however.

The smelt fishery produced about the same quantity as in the year before.

Alewives or gaspereaux were more plentiful in the St. John Harbour district. The total catch as a consequence was almost three times greater than that for the preceding year.

INLAND FISHERIES

The production of the chief kinds of commercial fish in inland waters, with the exception of pickerel from the lakes of the Prairie Provinces, was less than in the preceding year. The catch of whitefish was about 25,000 cwts. less, and of tullibee it was 16,000 cwts. less. The catch of pike, however, fell short by about 1,200 cwts. only and goldeyes by about 400 cwts. Pickerel on the other hand gave an increase of about 18,000 cwts.

The small catch of 1922 was due largely to the fact that the ice on the Western lakes was not sufficiently strong to permit operations thereon until late in the season.

The fisheries of Ontario in 1922 taken all over gave a somewhat greater production than in the preceding year, and there were increased catches of herring, trout and dore, but those of whitefish and blue pickerel were slightly less.

Fishing results in the St. John River district of New Brunswick were not quite so good as those for the year before.

PACIFIC FISHERIES

Salmon.—The catch of 1922 was very much greater than that of the year before. The pack of all kinds of salmon in the year under review was in round figures 1,290,000 cases. This was double the pack of 1921. The pack of that year, however, was the smallest since 1908. The 1922 pack was also greater than the 1920 pack by 102,000 cases. On the other hand, the pack of 1922 was that much less than the one of 1919. It was also less than the packs of 1918 and 1917 by 326,000 and 267,000 cases respectively. The great increase in the 1922 pack over that in 1921 was derived chiefly from what are known as the cheaper varieties, pinks and chums. The pack of pinks in 1921 was 192,000 cases, whereas there were 581,000 cases packed in 1922. In 1921 there were 71,000 cases of chums packed, while in 1922, 258,000 cases were packed.

Halibut.—There were 293,000 cwts of halibut landed, against 325,000 cwts. for the year before. The catch of the year before, however, was very considerably greater than that of 1920. United States vessels, as usual, landed about two-thirds of the total catch, principally at Prince Rupert.

Herring.—These were abundant, and there was a greater quantity taken. The Oriental demand for herring in a dry salted state was good. During the winter season of 1922-23 a total of almost 160,000 boxes, each of which contained 400 pounds of fish, were salted and shipped across the Pacific. A considerable portion of the catch was used for baiting purposes by the halibut fishermen. A small portion was disposed of fresh and as kippers. The increase in the United States tariff practically cut off the chief market for herring cured in the Scotch style. Consequently, a few thousand barrels only were cured during the past season. Such as were cured in this way were packed in small packages for disposal in the home markets, especially those of the Western Provinces, where a satisfactory trade is being gradually worked up.

Pilchards.—These continue to be as abundant as ever on the west coast of Vancouver island. The bulk of the catch is canned. There were 19,000 cases packed in 1922, as against 16,000 in the year before.

Other Sea Fish.—The various kinds of cod were taken in about the same quantities as in the preceding year. The catch of flatfish was greater, there being 12,000 cwts. landed against 4,000 cwts. in the year before. Oysters, clams and crabs were taken in increased quantities.

Whales and Seals.—Two whaling stations were in operation during the year and 187 whales were captured. There were 930 fur seals taken during the season by the Indians along the coast.

INSPECTION OF FISH

During the year 1922 the work of inspection was carried on by a staff of three permanent and ten temporary, or seasonal inspectors on the Atlantic coast, and two seasonal inspectors on the Pacific coast. On the Atlantic coast, 64,000 barrels of herring, mackerel, gaspereau and salmon passed under the eyes of the inspectors who examined them as to the quality and construction of barrels, and the quality, grade and curing of the fish in accordance with the requirements of the Fish Inspection Act.

In addition to the actual work of inspections, packers and coopers were visited periodically and given instructions as to the requirements of the Act. Unfortunately the generally depressed conditions of the markets, together with the effect of the increased tariff imposed by the United States, caused sales of pickled fish to be exceedingly slow and at low rates during the year, notwithstanding the very great improvement in both barrels and fish that has been brought about by our system of inspection. Some are inclined to attribute this slowness of trading in some degree to a gradual getting away from eating pickled fish on the part of those who have hitherto consumed the bulk of our salted herring and mackerel.

Until the past season, pickled herring, mackerel, gaspereau and salmon and the barrels for such, only came under inspection. The Act, however, provides that any kind of cured fish may, by order in council, be made subject to inspection just as soon as necessity and wisdom warrant the taking of such a step. Under this provision it was found necessary last fall to take this step in connection with the dry salted herring trade of British Columbia. This is a very important and growing trade. The product is shipped across the Pacific to China. For some time this branch of the industry has been struggling with a difficulty due to the lack of uniformity in the curing of the fish, the size of the package and the weight of fish contained in them. In order, therefore, to remove those conditions, and with a view to stabilizing the business, a set of regulations was prepared and adopted, after consultation with the packers, by which a uniform method of curing and a standard size of package were established. During the past winter, therefore, curing and packing operations were carried on for the first time under the supervision of departmental inspectors. Approximately 160,000 boxes, each of which contained 400 pounds of fish, were examined by the inspectors. With each lot inspected and shipped, a certificate of inspection was given to the shipper. Our Trade Commissioner at Shanghai referring to this inspection system says: "It will go far to assist the sale of Canadian herring in China for which there is a large market, and also protect both the shipper and the buyer."

While inspectors have no specific authority to deal with the curing of cod, haddock, hake and such like fish, they are instructed to keep an eye on that branch of the industry and by reason of their position to point out defects and indicate improvements.

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A pamphlet entitled "The Dried Cod Fish Trade," which deals comprehensively with the business from the splitting and salting to the drying and marketing, was issued by the department last year as a guide to officers and to the trade generally. The pamphlet was distributed to individual fishermen and merchants both in the French and English languages, and no doubt will do much towards improving the standard of cure.

INSPECTION OF CANNERIES AND CANNING FISH

The inspection of fish canneries, the raw material to be used therein, the whole process of canning, the canned product and the labelling and designating of such is carried on under the provisions of the Meat and Canned Foods Act and the regulations made thereunder.

This inspection aims at the extension of trade by improving the quality of the product and the protection of the public by preventing the packing of unsound fish and seeing that all cans of fish are correctly labelled. Imported canned fish is subject to inspection under the Act and must be in accordance with the provisions thereof as to soundness, weight and proper designation.

By a rational and judicious enforcement of the various requirements of the Act, a very marked improvement has been gradually brought about in recent years, not only in the conditions under which canning operations are carried on from a sanitary point of view, but in the quality of the canned product as well. For example, the huge salmon canning industry of British Columbia is now carried on under conditions that could not very well be greatly improved upon.

Numerous defects in buildings and equipment, more especially in lobster canneries, were remedied in the course of the year at the instigation of the inspecting officers.

A number of lightweight cans of lobsters, which were packed early in the season were seized and disposed of in accordance with the regulations, while several shipments of canned salmon, of the home as well as the imported product, were held because of improper labelling.

During the spring of 1922 it was discovered that the Act as well as the regulations, which were amended in 1917 and 1919, contained several sections which were either burdensome to the trade or incapable of proper application; consequently departmental officials met the packers and discussed the whole Act and the regulations with a view to amending both to such an extent as was necessary for the proper protection of the packers and the consuming public and for the betterment of the industry. In due course the amendments agreed upon were made law and became effective at the beginning of the packing season of 1923.

For a great many years a proportion of the annual pack of canned lobsters has caused trouble and loss to the trade because of a discoloration of the meat which took place after it had been in the cans for some time. The department, through the Research Council of Canada, has been endeavouring to find the cause of the discoloration and a result of investigations carried on by Dr. F. C. Harrison, Principal of MacDonald College, both the cause and the cure for it have been discovered. Information was duly conveyed to the industry by means of a pamphlet issued by the Research Council.

FISHERIES STATISTICS

The work of collecting, compiling and publishing monthly, quarterly and annual statistics of the fisheries was carried on by the Fish Inspection and Statistical Branch through the means of the fishery officers as usual.

In the spring of 1922 an endeavour was made to secure from captains of deep-sea fishing vessels special statistical information as to the quantities and

kinds of fish taken by them on the various banks during the year. The information covered the number of actual fishing days, the location of the ground fished on each day, the catching power used and the quantity and kind of fish caught per day. The number of captains who complied with the department's request for this information was relatively small. It is hoped, however, that a greater number will co-operate next season.

With a view to securing more definite knowledge concerning the movements and size of the bodies of mackerel which strike the coast annually, our fishery overseers in the mackerel fishing districts of the Atlantic coast supplied the department during the season of 1922 with special weekly information covering the first appearance of the fish, the quantity of the various sizes taken, and the kinds of the gear used in their respective districts. The information is intended to be used by the Biological Board in connection with their investigations.

BAIT REPORTING SERVICE

The Bait Reporting Service which was instituted on the Atlantic coast in 1913, and which has since been in operation yearly, was again resumed with some modifications owing to changes in conditions which have arisen since the service was first inaugurated. Captains and owners of fishing vessels, as well as others interested, were by means of this service provided with information regarding the catch of bait at various points along the coasts of the Maritime Provinces and the Magdalen islands. Throughout the spring and summer officers of the department gathered information regarding the landing of bait, and submitted it daily by telegraph to certain ports where the information, in accordance with arrangements made, was posted in conspicuous places. The information was also published without charge by the Halifax daily papers. Throughout the spring monthly telegrams were forwarded from the Magdalen islands and North Sydney, Cape Breton, to Canso, Halifax and Lunenburg reporting ice conditions and bait supplies. During July and August, information regarding bait landed at points along the coasts of Halifax and Guysboro counties was telegraphed to North Sydney, Canso, Halifax, Lunenburg, Shelburne, Lockeport and Yarmouth. Similar reports were also forwarded from Lockeport to Halifax and Canso.

SCOUTING FOR MACKEREL

Fisheries protection cruisers, while following the movements of the United States mackerel purse-seining fleet, kept track, as in the preceding year, of the location and movement of the schools of mackerel, and sent wireless messages to shore daily, giving the results of their observations.

A full report on scouting and the movements of the fish by the captain of the cruiser *Arras* will be found on page 40.

BRITISH COLUMBIA FISHERIES COMMISSION INQUIRY

During the months of August and September, 1922, a commission consisting of certain members of the Standing Committee on Marine and Fisheries in the House of Commons investigated the fisheries conditions of British Columbia. The commission's report, which has already been published and distributed, contained a number of recommendations looking not only to the conservation of the fisheries resources of our Pacific province, but also to removing any disabilities under which the industry was being carried on. As a result of the inquiry, and in accordance with the commission's recommendations, several important changes in the regulations were made, which become effective during the season of 1923.

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FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1922, payment was made on the following basis:—

To owners of vessels entitled to receive bounty—\$1 per registered ton: payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty—\$6.95 each.

To owners of boats measuring not less than 13 feet keel—\$1 per boat.

To boat fishermen entitled to receive bounty—\$5.35 each.

There were 11,209 bounty claims received and 11,204 paid. In the preceding year, 11,674 bounty claims received and 11,654 paid.

The total amount paid was \$157,172.55, allocated as follows:—

To 624 vessels and their crews..... \$ 47,478 85

To 10,580 boats and their crews..... 109,693 70

FISHING BOUNTY EXPENDITURE, 1922-23

County	Boats	Men	Amount	Ves-sels	Tons	Average tonnage	Men	Amount	Paid	Re-jected
			\$ cts.					\$ cts.		
Annapolis.....	149	260	1,540 00	3	152	51	47	478 65	152	
Antigonish.....	109	171	1,023 85						109	
Cape Breton.....	344	619	3,658 65	22	294	13	79	843 20	366	
Colchester.....	1	1	6 35						1	
Cumberland.....	5	7	42 45	1	11	11	2	24 90	6	
Digby.....	407	716	4,237 60	4	120	30	36	370 20	411	2
Guysboro.....	732	1,193	7,114 50	47	702	15	213	2,182 35	779	
Halifax.....	1,229	1,682	10,227 70	73	1,119	15	326	3,384 70	1,302	
Inverness.....	372	857	4,957 20	20	287	14	92	926 40	392	
Kings.....	44	70	418 50						44	
Lunenburg.....	608	748	4,609 75	142	8,269	58	2,086	22,853 70	750	
Pictou.....	40	52	318 20	1	17	17	4	44 80	41	
Queens.....	175	305	1,806 65	14	173	12	50	520 50	189	
Richmond.....	471	837	4,948 45	25	411	11	119	1,238 10	496	
Shelburne.....	564	1,091	6,400 80	26	686	26	192	2,020 40	590	
Victoria.....	273	413	2,482 45	10	144	14	36	394 20	283	
Yarmouth.....	109	243	1,409 05	14	852	61	276	2,770 20	123	
Total.....	5,632	9,265	55,202 15	402	13,237	33	3,558	38,052 30	6,034	2
Charlotte.....	368	631	3,743 75	4	57	14	10	126 50	372	
Gloucester.....	151	367	2,114 00	198	2,921	15	827	8,668 80	349	
Kent.....	88	184	1,072 40	7	71	10	19	203 05	95	2
Northumberland.....	2	6	34 10	1	21	21	5	55 75	3	
Restigouche.....	3	7	40 45						3	
St. John.....	22	36	214 60	1	17	17	3	37 85	23	
Total.....	634	1,231	7,219 30	211	3,087	15	864	9,091 95	845	2
Kings.....	349	484	2,938 10	2	31	15	4	58 80	351	
Prince.....	285	558	3,269 95	5	63	12	12	146 40	290	
Queens.....	97	218	1,263 25	1	14	14	2	27 90	98	
Total.....	731	1,260	7,471 30	8	108	13	18	233 10	739	
Bonaventure.....	309	569	3,352 15	2	22	11	5	56 75	311	
Gaspe.....	2,483	4,829	28,306 50	1	10	10	5	44 75	2,484	1
Matane.....	119	182	1,094 35						119	
Rimouski.....	1	1	6 30						1	
Saguenay.....	671	1,190	7,041 65						671	
Total.....	3,583	6,771	39,800 95	3	32	11	10	101 50	3,586	1
Grand Total.....	10,580	18,527	109,693 70	624	16,464	26	4,450	47,478 85	11,204	5

FISH CULTURE

The fish cultural operations of the department during the calendar year 1922 embraced the more important fresh water and anadromous food fishes, such as Atlantic salmon in the east, whitefish, salmon trout and pickerel in the interior, and the Pacific salmon in the west.

A portion of the whitefish and pickerel eggs and practically all the salmon trout eggs were obtained from the commercial catch, and the department is, therefore, largely dependent upon the co-operation and the success of the fishermen for such eggs. The bulk of the salmon trout are caught in gill-nets that are ordinarily lifted every twenty-four hours, but during cold and stormy weather are often not lifted for much longer periods. It is therefore not surprising that the eggs obtained from such sources are not of the best quality, but all that are saved by the hatcheries are that much direct gain to the fishery, as they would otherwise be totally destroyed.

The commercial species of the interior were distributed in a free-swimming stage after the food sac was absorbed, on the natural spawning grounds of the larger lakes. The bulk of the salmon in the eastern and in the western provinces was also distributed as fry after the food sac was absorbed, but a larger number than ever before was retained and fed in ponds and enclosures, and liberated in the advanced fry and fingerling stages. The sporting varieties of trout were handled in limited numbers, and, after adequate return was made to the waters in which such eggs were collected, the most of the balance was distributed in public waters, largely in response to applications. Small allotments were made to privately controlled or leased areas on the payment of nominal prices and transportation expenses.

The total distribution of all species was over thirty-three million larger than the distribution of last year and over one hundred and twenty-eight and a half million larger than the distribution of 1920. Several lakes and streams in British Columbia and the Prairie Provinces that are not readily accessible from hatcheries received allotments of fish caught in and transferred from other waters.

COLLECTION OF EGGS

Atlantic salmon were more plentiful than they have been for years in all the rivers of the Maritime Provinces where hatchery operations were carried on and the full supply of such eggs was readily obtained. This collection could have been increased without difficulty had it been desired. The capture of four hundred and sixty-five salmon on September 23 and of four hundred and fifty on September 28 in the two nets that were operated for hatchery purposes in the Miramichi river is some indication of the present condition of this stream.

All previous collections of whitefish eggs were exceeded in the bay of Quinte and in Georgian bay. The collection in lake Winnipegosis was larger than it has been for several years and was only half a million smaller than the best since the hatchery was established in 1909. There was a small increase in the lake of the Woods and a decrease in lake Winnipeg.

There was a small increase in the total collection of pickerel, which was largely due to a change in methods at the Sarnia hatchery. The collection at this point was increased to eighty-one million from twelve million in 1921.

In recent years conditions have been against a large collection from the commercial nets in the neighbourhood of Point Edward, lake Huron. The run of fish during the early spring and before the spawning period has been satisfactory, but comparatively few were taken during the spawning season in a

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ripe condition. The unripe fish that were retained in the pound-nets did not develop satisfactorily on account of the low temperature of the water, although efforts were made in 1921 to retain some of the early fish in enclosures close to the nets. This season a portion of the catch of three fishermen was transferred from the nets, a distance of from six to nine miles and retained in pound-net pots in the warmer water of Sarnia bay. The water here was at times as much as ten degrees warmer than it was in the lake where the fish were caught. The higher temperature had the desired results and the fish ripened very quickly. The loss in the retainers was practically nil and the eggs throughout were of high quality. On account of the loss in weight through stripping, the fishermen were paid fifteen cents each for the handling of the fish, which were returned to them after they were stripped. Had this method not been followed, these eggs—fifty-seven million—would have been a total loss so far as reproduction was concerned, as the fish would not ripen in the nets and would have been placed on the market. Under the conditions that have obtained in recent years, not more than four to five per cent of the commercial catch has been ripe when caught.

The collection in the lake of the Woods for the Kenora hatchery has each year since its inception, with the single exception of 1920, been larger than those of all preceding years. This gratifying condition continued during the current season and the collection was over ten million larger than the record collection of 1921.

The establishment of the provincial hatchery at Sault Ste. Marie necessitated a reallocation of the collection areas in lake Huron and Georgian bay previously covered by this department's hatcheries. This reallocation was made on a geographic basis.

Weather conditions generally were more favourable than usual, and although the total collecting area was considerably smaller the total collection of salmon trout eggs from lake Huron and Georgian bay was larger than it was in 1921 and the quality of the eggs was better. In the westerly portion of lake Superior, where the Port Arthur hatchery procures its supply of eggs, the majority of the nets were put out of commission about the middle of October, and owing to continuous unfavourable weather were pulled out towards the end of the month. The collection was consequently not as large as it was last year and owing to the conditions that obtained when they were taken a considerable portion of the eggs was not up to the usual standard. The total collection of such eggs was, however, slightly larger than it was last year.

The total collections of sockeye eggs and of the eggs of all species of Pacific salmon were respectively over three and two million greater than last year and the collection of sockeye eggs in the Fraser River watershed was nearly seventy per cent greater than it was in the preceding cycle year 1918. The run of this species to the Pitt Lake river was at least twenty-five per cent greater than in any year since the hatchery was built in 1917. The run to Cultus lake compared favourably with that of the cycle year 1918, and was about the same as last year. Conditions were greatly improved on the Harrison lake area, where over two million eggs were obtained as compared with seven hundred thousand last year. Morris creek alone produced over one million eggs as against sixty-five thousand last year. The run to the Birkenhead river was heavier than that of last season and almost as good as the banner year 1920. Twenty-six million eggs were collected and not more than twenty-five per cent of the fish available were handled. All the spawning grounds of this area were heavily seeded and in view of this twelve million eyed eggs were transferred from the Pemberton hatchery to other districts above Hell's gate on the Fraser

River watershed, where conditions were not so favourable. These transfers were as follows:—

Stuart Lake hatchery—for the seeding of the Upper Fraser river.....	4,000,000
Cultus Lake hatchery—for the seeding of Eagle river, Shuswap Lake system.....	4,000,000
Harrison Lake hatchery—for the seeding of Morris creek and other streams tributary to Harrison lake.....	2,000,000
Horsefly river—tributary to Quesnel lake.....	2,000,000

The run of sockeye to Owikano lake, Rivers inlet, was similar to that of last year, inasmuch as the streams at the head of the lake that have been disregarded so far as the collection of eggs and the distribution of fry are concerned and have been left to natural propagation, were failures, but those at the lower end of the lake carried good runs and the collection in Quap could readily have been doubled. The run to the district as a whole was fair but unfortunately the severe freshets which scoured many of the creeks did serious damage to the natural seeding. The necessary additions have been made to the hatchery equipment and all the suitable streams tributary to the lake are now being stocked with eyed eggs or fry.

The whole of the Babine lake area was better seeded than last year—although last year was well up to the average—and as well, if not better, seeded than it was in 1918. Pierre creek carried probably twice as many salmon as last year; Fulton river was fairly well seeded; Fifteen Mile, Four Mile and Grizzly creeks and Beaver river were abundantly seeded, and Babine river was well up to the average of all good years.

The conditions in the hatchery creek again demonstrated the value of past operations. The fish were so plentiful that after a collection of eight million one hundred thousand eggs was made there were more in sight than had been handled by the hatchery staff.

The Bulkley river area carried a good run, which was as good, if not better, than that of 1918.

The run of sockeye to the Kitsumgallum area was better than it was last year, and was at least equal to that of 1918. The eggs, however, in 1918 were undisturbed by freshets, while this season heavy rains occurred, and the creeks were flooded which, no doubt, caused some loss.

The aggregate run of salmon to the Lakelse lake district in 1922 was heavy, particularly the sockeye and pinks. The run of spring salmon was only up to the average of recent years. The run of coho was fair and the run of chums small.

The sockeye came in two runs, the second one being very heavy and as late as October, large schools were lying off the mouths of Salmon and Williams creeks. Schallabuchan creek was poorly stocked, but the runs to Granite, Salmon and Williams creeks more than made up for this.

Towards the end of November the severest freshet since 1917 occurred. The upper spawning beds of all creeks were badly scoured and the damage to the natural seeding must have been excessive. The freshets also brought down a large amount of fine glacial silt which sifted into the gravel and buried the lower spawning beds which were not so greatly damaged by scouring.

A great improvement in the sockeye run over that of last year, and also over the cycle year of 1918 was in evidence in Kennedy lake.

After approximately seventy-five thousand sockeye salmon had been captured and canned by the Clayoquot Sound cannery, a plentiful supply reached the spawning grounds. The majority of these were apparently beach spawners and only a small proportion proceeded to the spawning areas in tributary streams. In this connection it is interesting to note that in the past the distribution of the fry was largely confined to the beaches of the lake in the vicinity of the hatchery, and the returning parent fish now frequent those

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beaches; whilst at other points which have not received the assistance of artificial methods, but where the conditions appear to be in every way favourable for the natural propagation of salmon, poor returns of parent fish were noted. The distribution either with eyed eggs or fry is now being made to all suitable and accessible places in Kennedy lake and its tributaries.

Over nine million sockeye eggs were taken without difficulty, and sufficient parent fish were left to adequately seed the spawning area. The cannery which draws very largely from this area put up five thousand five hundred cases sockeye, which is the second largest pack in its history.

The lake was favourably low during the spawning season, and the loss that is sometimes due to the water receding after the eggs are deposited should be small. Reference was made last year to the probable loss in salmon eggs that in 1921 were deposited along the gravel bars and beaches of Kennedy lake that usually go dry during the low water. No freshets occurred in this district during the following winter, and on April 29 the water was still low. Examination of the beaches showed a heavy loss in eggs, and a much heavier loss in fry after they had hatched on account of the low stage of water. From an examination of these beaches and gravel bars the superintendent of the hatchery estimates that less than one per cent of the fry resulting from last season's naturally spawned eggs reached the open water.

The superintendent of the Anderson Lake hatchery estimates that at least one hundred and twenty-five thousand sockeye reached the spawning grounds of Anderson lake this year as compared with ninety thousand last year. The run of coho was fairly good, being twenty-five per cent greater than last season. A few spring and chum spawned in the outlet of the lake. The natural spawning beds were overcrowded and immense numbers of the early eggs were destroyed by being disturbed and dug up by later spawning fish. Climatic conditions were favourable as no severe freshets occurred to scour the creeks and the water remained at a low level during the spawning season, so that few eggs will be left exposed through further lowering of the water. As the spawning beds were overseeded, a portion of the eggs taken for the hatchery will be transferred when eyed, and planted under suitable conditions in streams tributary to Great Central and Sproat lakes.

There was a good run of spring and a heavy run of coho in the Cowichan Lake district and until December 13 climatic conditions were favourable as the heavy freshets that did so much damage last year did not recur. While more spring salmon were caught the collection of such eggs was smaller than last year as these fish were so green and hard that most of them would not develop their eggs satisfactorily in confinement and had to be liberated. The Superintendent of the hatchery suggests that this earlier arrival at the hatchery nets and harder condition of the fish was due to the removal of obstructions at Skutz falls on the Cowichan river. Previously these obstructions kept the fish from ascending during low water but since their removal there is nothing to prevent their ascent. The same unripe condition was found in the coho but these fish were so plentiful that no difficulty was experienced in getting all the eggs required.

The total collection of eggs of the different species made during 1922 was as follows:—

Atlantic salmon.....	29,397,200
Cutthroat trout.....	660,380
Steelhead salmon.....	99,400
Kamloops trout.....	965,200
Sockeye salmon.....	83,307,835
Spring salmon.....	2,647,360
Albino spring salmon.....	156
Coho salmon.....	1,848,700
Chum salmon.....	3,086,670
Speckled trout.....	552,827
Whitefish.....	599,260,000
Salmon trout.....	42,737,000
Cisco.....	3,500,000
Pickere!.....	234,009,330
	<hr/> 1,002,072,058

In addition to the eggs collected, one hundred thousand landlocked salmon eggs, two hundred and ninety-three thousand rainbow trout eggs, three hundred thousand cutthroat trout eggs and two hundred thousand speckled trout eggs were received from the Federal and State departments of the United States in exchange for atlantic salmon eggs and one hundred thousand brown trout eggs in exchange for speckled trout eggs.

Under an arrangement made with the Department of Game and Fisheries, concurred in by this department, the officers of the United States Federal hatchery at Cape Vincent, N.Y., collected whitefish eggs in Canadian waters on the Ontario side of the boundary line. This department is indebted to the United States Bureau of Fisheries for a present of 14,000,000 whitefish eggs from the surplus collection at the Cape Vincent hatchery. These eggs were laid down in the Kingsville hatchery. It is also indebted to the Department of Game and Fisheries, Toronto, for 13,120,000 whitefish eggs—7,855,000 were laid down in the Port Arthur hatchery and 5,265,000 in the Kingsville hatchery—and 15,000,000 pickerel eggs that it collected in Hay bay, bay of Quinte. These eggs were placed in the Thurlow hatchery and a portion of the resulting fry were placed at the disposal of the Provincial department for stocking waters that are not as readily accessible from its own hatcheries.

A surplus collection of 1,498,000 salmon trout eggs, included in the above statement, from this department's hatchery at Wiarton was turned over to the Quebec Provincial Government.

REARING OF FINGERLINGS

The facilities for feeding fry were enlarged or improved at various salmon hatcheries and the output of advanced fry and fingerlings was greater than ever before. The expansion in this direction at the hatcheries now operated by this department is indicated by the following figures:—

Year	Output
1922.....	28,670,900
1921.....	22,253,000
1920.....	8,539,100

The supplying of the more isolated hatcheries—where cold storage facilities are not available and the means of transportation do not permit of fresh food being brought in from outside points, where it can be procured—is not always an easy matter. Cheap grades of canned salmon and canned whale meat and fishotein are kept in stock and these preserved foods are supplemented by fresh coarse fish caught by the hatchery staffs. The superintendent of the Cultus Lake hatchery has developed several of the smaller creeks that flow into the lake as natural retaining ponds or protected areas in which the fry are retained, without crowding, under practically natural conditions, and allowed to escape to the lake as their growth and consumption of food demand.

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The results that follow the distribution of eyed eggs and fry in lakes devoid of fish life and in which plankton and other natural fry food is abundant was again fully demonstrated. Such lakes or natural retaining ponds are not numerous, but wherever found are being utilized to the fullest extent. In several instances sockeye distributed in these lakes have in three months attained the size of the average Fraser river fish when twelve months old.

There are numerous salmon waters, particularly in British Columbia which are inaccessible from existing hatcheries, so far as stocking them with fry is concerned. These waters have consequently not been stocked and many of them have become depleted. The surplus eggs that are available in the more productive areas are now, after they are eyed in the hatcheries, being utilized to seed these areas. These eggs are planted in selected places in the gravel of what are known to have been at one time the principal spawning grounds. This work was taken up in a systematic way in British Columbia in 1921, and last summer the most encouraging reports were received from all areas that were so seeded. Immense numbers of fry and fingerlings were seen in waters in which it was known that very few, if any, parent fish had spawned. Several of what were at one time the principal spawning grounds of the Stuart Lake system, the Quesnel Lake system, the Seton-Anderson Lake system and the Shuswap Lakes system—all above Hell's gate on the Fraser—were seeded with eyed eggs from the Pemberton hatchery which is below Hell's gate. Great Central and Sproat lakes, Vancouver island, and several smaller lakes on the west coast were similarly and respectively seeded from the Anderson and Rivers Inlet hatcheries, as were other waters nearer the other establishments.

ACCLIMATIZATION

Gratifying results are in evidence from the efforts to establish some of the more important food and sport fish in waters to which they are not indigenous. Eastern whitefish in various stages of growth up to four and one-half pounds in weight have been taken in British Columbia lakes; several spring salmon of the Pacific, some of them weighing twenty pounds, were caught in lake Ontario; Atlantic salmon of various sizes from fingerlings to fresh-run fish in prime condition and kelt, on their return to sea after spawning, have been caught in the Cowichan river, British Columbia; black bass are firmly established in Christina lake in southern British Columbia, and several lakes in Vancouver island. Eastern speckled trout are also found in southern British Columbia, and fingerling rainbow trout were this season quite numerous in several of the foothill streams of Alberta in which they were last year distributed from the Banff hatchery.

MARKING OF FISH

The marking of fingerling and adult salmon was continued in the eastern and western provinces for the purpose of gaining some definite information with regard to the life history of these fish. Thirty kelt caught on their seaward migration, and five hundred and twenty-three adult Atlantic salmon were marked and liberated—the latter after they were stripped at the various retaining ponds—in the Maritime Provinces. The mark used was a numbered silver tag, attached to the dorsal fin. Over one hundred thousand fingerling salmon were marked and liberated at the different hatcheries in the east and in the west principally by the removal of the adipose fin. It is hoped that the recaptures of these marked fish will throw some light on the life history of the species.

The desirability of thorough scientific investigation into all matters that affect the reproduction of fish has been receiving attention, and at the beginning of last year the question of investigation into the life-history of the salmon,

spawning ground conditions, and other related matters, as they affect the Fraser river, was referred to the Biological Board.

The question of the ownership and administration of the fisheries of the province of Quebec—which has been the subject of considerable negotiation and some litigation—was settled by agreement of the Dominion and Provincial Governments. The Provincial Government took over from June 30, 1922, the administration and protection of all the fisheries of the province—with the exception of those about the Magdalen Islands—including the administration of the hatcheries. Under this agreement, the Tadoussac and Gaspé main hatcheries, the Bergeronnes, Ste. Marguerite and Dartmouth, sub-hatcheries, and the Tadoussac and York salmon retaining ponds, with all their equipment, were transferred to the province and are now administered by the Department of Colonization, Mines and Fisheries, Quebec.

At the present time this department is operating thirty-two main hatcheries, seven sub-hatcheries, five salmon retaining ponds, and several egg-collecting and one eyeing station. The distribution of eggs and fish by species during 1922 was as follows:—

Nova Scotia—		
Atlantic salmon.....	9,821,435	
Speckled trout.....	617,996	
		10,439,431
New Brunswick—		
Atlantic salmon.....	10,825,156	
Ouananiche.....	3,650	
Landlocked salmon.....	65,128	
Rainbow trout.....	58,024	
Spring salmon.....	197	
Speckled trout.....	193,950	
Brown trout.....	63,043	
		11,209,148
Prince Edward Island—		
Atlantic salmon.....	1,482,300	
Speckled trout.....	177,028	
		1,659,328
Quebec—		
Atlantic salmon.....	2,914,633	
Speckled trout.....	68,220	
		2,982,853
Ontario—		
Spring salmon.....	194,470	
Whitefish.....	323,143,000	
Salmon trout.....	24,211,290	
Cisco.....	3,000	
Pickarel.....	165,797,330	
		513,349,090
Manitoba—		
Whitefish.....	206,173,750	
Pickarel.....	10,678,000	
		216,851,750
Saskatchewan—		
Whitefish.....	30,000,000	
		30,000,000
Alberta—		
Atlantic salmon.....	266,177	
Rainbow trout.....	307,600	
Cutthroat trout.....	393,505	
Salmon trout.....	175,935	
		1,143,217
British Columbia—		
Atlantic salmon.....	382,839	
Cutthroat trout.....	213,391	
Steelhead salmon.....	90,038	
Kamloops trout.....	899,343	
Sockeye salmon.....	73,329,557	
Albino spring salmon.....	75	
Spring salmon.....	1,856,930	
Coho salmon.....	1,235,000	
Pink salmon.....	3,878,800	
Speckled trout.....	3,303	
Whitefish.....	9,463,000	
		91,352,276
Total distribution.....		878,987,093

BIOLOGICAL STATIONS IN CANADA

The Marine Biological Board has two stations at which research work is carried on, one on the Atlantic coast at St. Andrews, N.B., and the other on the Pacific coast at Departure Bay, near Nanaimo, B.C. The two stations are equipped with research tables, fresh and salt water taps, chemical reagents, glassware, and a complete outfit of nets, dredges, etc., for deep-sea and inshore investigations.

Gasolene launches and small boats with the necessary crews are at the service of the workers. Each station has a library of representative scientific works.

The laboratories and residences are open from June until September. The work of the stations each season includes fishery investigations, life-history, growth and food of fishes, faunistic work, biochemical, bacteriological and hydrographic researches, including physical and chemical studies of sea-waters.

The scientific staff for each season consists of several classes of workers.

1. Senior workers who are members of the Biological Board and professors from different Canadian universities.
2. Qualified investigators recommended from various universities.
3. Qualified investigators who desire to undertake any research which has only a very indirect economic bearing.
4. Members of the Biological staff of any Canadian university who desire to collect material.

Apart from evening lectures, the investigators who deal with their own special subject of research, no teaching is done. The directors, however, are ready to give as far as they can, such advice or aid as may be required by beginners.

During the year 1922 the following scientific investigators carried on research as indicated below:—

ATLANTIC STATION, ST. ANDREWS, N.B.

Nineteen scientists conducted investigations at the Atlantic Station:—

Professor L. W. Bailey: Diatoms.

Professor C. C. Benson, University of Toronto: The Chemistry of fish muscle

Mr. S. W. Britton, McGill University: The temperature-reactions of fishes.

Professor C. J. Connolly, St. Francis Xavier's College: The larvæ of decapods.

Mr. H. S. Coulthard, University of Toronto: The growth of the mussel.

Dr. E. C. Hood, Macdonald College: The bacteriology of fish in cold storage.

Professor A. G. Huntsman: The factors influencing the growth and distribution of marine animals.

Dr. F. S. Jackson, McGill University: The histology of the pancreas of fishes.

Professor A. B. Klugh, Queen's University: The culture of the ostracods and copepods of freshwater pools.

Professor A. P. Knight: Problems in lobster canning.

Mr. A. H. Leim, University of Toronto: The effect of varying temperature, salinity and acidity on calanus.

Mr. J. Murray Luck, University of Toronto: The effects of various salts on metabolism in bacteria.

Professor J. J. R. Macleod, University of Toronto: The occurrence of insulin in fishes.

Mr. Neil McLeod, Jr., McGill University: The life history of the freshwater smelt.

Mr. D. J. MacLeod, Queen's University: Assisting Professor Reed.

Dr. Louis Pare, Montreal, Que.: The bacteriology of canned lobster.

Professor G. B. Reed, Queen's University: The bacteriology of canned lobster.

Miss E. M. Taylor, University of Toronto: The factors determining successful development in certain marine animals.

Miss Margaret Wilton, Queen's University: Assisting Prof. Klugh.

The weekly and monthly collections of plankton and hydrographic material at established points in the Passamaquoddy region have been continued, and daily records of the temperature of water and air at St. Andrews have been taken for more than two years, and are being continued. The study of the success of the spawning of the smelt in the Passamaquoddy region have been continued.

Field Investigations.—In place of the usual intensive investigation of a particular region, the work of the *Prince* for the summer season was the following up of the spawning of the mackerel along the outer coast of Nova Scotia. The village of Hubbards, situated on St. Margaret's bay, served as the base for this work. The parish hall was obtained for a laboratory. Professor Philip Cox, of the University of New Brunswick, was engaged at the laboratory in studying the order in the appearance of the mackerel along the coast, and in identifying the fishes obtained. Mr. M. I. Sparks, of the University of Toronto, examined the plankton catches for mackerel eggs and larvæ.

Professor Knight continued, during the latter part of the season at Summerside, P.E.I., his investigations on the natural history of the lobster and on lobster canning.

Professor A. D. Robertson, Western University, London, Ont., continued his studies of the oyster, with headquarters near Bedford, P.E.I. In this work he was assisted by Miss Kathleen Braithwaite, Mr. Claude McCallum and Mrs. Robertson.

Mr. A. H. Leim, of the University of Toronto, studied the life-history of the shad on the Shubenacadie river and Scotsman bay, N.S. Through the International Committee on Deep-Sea Fisheries Investigations co-operation was secured with Newfoundland and the United States in an extensive plan for determining the currents along the Atlantic coast; 1,736 drift bottles have been sent out by the station. Series of bottles were put out as follows: From St. John's eastward across the Grand Bank, through the courtesy of the Newfoundland Government; across Cabot strait by Mr. G. F. Sleggs, of Dalhousie University; from Canso across the continental shelf by C.G.S. *Arras*; and from near Cape Sable across the continental shelf by the Biological Boat *Prince*.

The Department of Marine and Fisheries gave the use of the C.G.S. *Arleux* from July 18 to 21 for conveying Dr. Huntsman and Miss Taylor from the station to St. Mary bay and back for the purpose of procuring living eggs of the cunner for experimental work.

Mr. D. A. MacKay, Ottawa Collegiate Institute, during the month of August explored St. Mary bay, N.S. to determine the presence and the habits of the very young lobsters.

Mr. Harkness, University of Toronto, arranged to carry on some studies, in accordance with Professor W. A. Clemens's plan of work, on Sturgeon Spawning and Experimental Sturgeon Culture of the Great Lakes.

During the week of September 20, Professor Knight and Professor Huntsman gave a number of lectures and demonstrations in the course of instruction for fishery officers at the conference held at Shediac, N.B.

Professor Knight during the season of 1922 continued his bacteriological investigations in and around lobster canneries with a view to improving the quality of the pack. His report on "Sanitation in Lobster Canneries" which

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was duly published and distributed amongst the canners, is calculated to bring about great and needed improvements in the equipment of the canneries and the methods of packing.

Professor Knight attended the meeting of the Packers' Branch of the Canadian Manufacturers' Association at Moncton, N.B., at the end of November, and laid before it a plan for the grading of lobster canneries, which with modifications was adopted.

PACIFIC STATION, DEPARTURE BAY, NANAIMO, B.C.

Professor C. McLean Fraser, University of British Columbia: Continued fishery investigations, salmon, halibut, herring, etc., also conjointing with International (U.S.) Committee researches on pile-borers and shipworms, faunistic studies, etc.

Mr. Cyril Berkeley: Biochemical studies on fish and their sea-water environment; bacterial studies.

Miss Mounce, University of Manitoba: Faunistic studies and preparation of biological material for researches.

Mr. H. A. Dunlop, University of British Columbia: Investigations at Harrison Lake hatchery, and spawning grounds into the biology of the sockeye and other Fraser river salmon.

Mr. G. Foerster, University of British Columbia: Fraser river sockeye investigations on Harrison lake and Lower Fraser.

NATURAL HISTORY OBSERVATIONS

During the summer and fall of 1922 the department's naturalist carried on observations as to the condition of lobsters during the month of June in Neguac bay, N.B., and adjacent waters. He was investigating the condition of the scallop fishery in Mahone bay, N.S., during the month of June. Investigations into the condition of the lobster were also made by him in the strait of Northumberland by the River Philip channel, N.S., Chock Fish river, N.B., before and during the open season last fall.

The naturalist also talked to the fishermen on the nature history and conservation of the lobster at localities on the strait of Northumberland and St. George's bay. These talks were made more interesting by the use of lantern slides.

INTERNATIONAL COMMITTEE ON DEEP SEA FISHERIES INVESTIGATIONS

This committee was formed in 1921 by the Governments of Canada, the United States, and Newfoundland, in order to form a permanent means of co-operation between these countries in investigations connected with the off-shore fisheries, both those that are in progress and also those that may be undertaken in the future.

During 1922 the Canadian personnel of the committee has been changed by the appointment of Professor J. Playfair McMurrich, vice Mr. Loring C. Christie, who resigned. Two meetings were held during the year, one at Montreal on May 26, and one at Washington on November 10. In order to make better provision for continuity in the work of the committee, Dr. Huntsman of Canada was appointed permanent secretary at the May meeting, and Dr. Moore, of the United States, permanent chairman, at the November meeting.

Among the subjects, in which co-operation between the three countries has been or is being arranged, may be mentioned the following: Improvement in

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the collection of statistics of the off-shore fisheries; the investigation of currents by means of drift bottles; and investigation of the life histories of the cod and haddock.

The interest of France, with her colonies, St. Pierre and Miquelon, in the cod-fishery of the Grand Banks has brought forward the matter of her being represented on the committee, and it is expected that she will have such representation in the near future.

In closing I regret to have again to report a loss of life, due to the prosecution of our fisheries. There were fourteen casualties on the Atlantic and one on the Pacific during the year 1922.

I am, sir,

Your obedient servant,

A. JOHNSTON,
Deputy Minister of Marine and Fisheries.

APPENDIX I.

REPORTS OF CHIEF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, ATLANTIC
FISHERIES DIVISION, FOR 1922

The operations for the year show a gratifying improvement over 1921, notwithstanding the unfavourable weather conditions the first three months prevented any general activity by the inshore fishermen. With the exception of the summer months the demand for fresh fish was heavy, and the dealers had difficulty in filling orders during the fall and winter months. The steam trawlers afforded the only regular supplies for the markets. If it had not been for the landings of these vessels, the fresh fish market, which has been expanding the past few years, would have been jeopardized.

For several years the prices for the landings by the netsmen and handliners were small, and there was little, if any, improvement during 1922. The unfavourable conditions in this respect were very greatly aggravated by the American tariff, resulting in the general discontent of the fishermen, as the buyers were unable to meet the duties on the exports to the United States, and sustained or increased the prices to the fishermen. The industry in this respect became fairly stabilized by the end of the year, as the effect of the tariff became established.

The outlook for 1923 is not very promising, and unless the conditions greatly improve, the restricted markets will seriously affect the industry. It is to be regretted that a very considerable number of our fishing population have either taken up other occupations or have left the country for the United States. It will be difficult, if not impossible, for some years to replace them, and their loss to the industry is to be deplored.

It will be interesting to note that while the total value of the fisheries show a decrease as compared with the banner years of the Great War period, there is a fair increase as compared with the opening year of the war. While the shrinkages in value accompanying the return to normalcy has led to some misgivings in connection with the development of the fisheries, as a matter of fact there has been a gratifying normal increase as compared with the year immediately preceding the war. It should be particularly borne in mind that during the past four years the export trade has been so demoralized that large and valuable markets have been practically closed to our dealers.

The statistics given in this report will be subject to some slight corrections, as the snow blockades which prevailed throughout the Maritime district prevented the prompt collection and preparation of the final reports.

The total number of fishing licenses issued was 22,644, divided among the districts as follows:—

Nova Scotia.....	11,253
New Brunswick.....	8,015
Prince Edward Island.....	2,893
Magdalen Islands.....	483

The following is a resume of the operations by provinces and districts:—

NOVA SCOTIA

The total landed value was \$7,443,746 as compared with \$7,018,076 the previous year. The marketed value of the cured and prepared product was \$10,209,258.

District No. 1, Cape Breton—Inspector McLeod.

The total landed value was \$935,457 as compared with \$767,435 in 1921, or an increase in value of \$168,022. The marketed value was \$1,537,004 or a decrease of \$41,046 from 1921.

Operations were carried on under most unfavourable conditions as the drift ice remained unusually late on the coast, greatly hampering the cod, haddock and lobster fishermen. The dark, rainy weather that prevailed during the summer season made impossible the proper drying of the fish, with the result that a large percentage of it was sold at prices that did not meet the expense of curing. The boisterous fall weather interefered with the mackerel fishing operations at Grand Etang, Margaree harbour and Eastern harbour, Inverness county, during the months of September and October, and practically prevented any fishing at Ingonish and Neil's harbour, Victoria county, in December and January—the period during which largest catches of cod and haddock were formerly landed. The prices for the principal catches were so low that the fishermen ceased operations early in the season.

The lobster fishery was particularly encouraging, the catch being 47,898 cwt., having a value of \$363,078, as compared with 36,215 cwt., and \$160,410 in 1921. The fish were plentiful during the brief period the fishermen were able to operate. The bulk of the catch was made the first three weeks of the season, except off the coast of isle Madame, Richmond county, where few were taken until the last two weeks. The largest catches were landed at Port Hood island, Grand Etang and Mabou Mines. The pack was as follows:—

County	Catch	Value	Pack	Value
		\$		\$
Richmond.....	5,665	45,294	2,190	61,744
Cape Breton.....	16,615	113,894	7,361	222,659
Victoria.....	8,419	66,298	4,147	124,350
Inverness.....	17,199	137,592	8,202	264,694
	47,898	363,078	21,900	673,452

The cod and haddock catch was 207,746 cwt., having a value of \$264,085, as compared with 241,860 cwt., and \$318,555 in 1921. The decrease in the catch was 34,114 cwt. and \$54,470 in value.

The mackerel catch was 38,372 cwt., having a value of \$154,551, as compared with 28,832 cwt., and \$134,363 in 1921. It should be noted that while there was an increase of 9,540 cwt. in the catch and \$20,188 in value, there was a decrease in the marketed value of \$25,860 due to the unusually heavy run of summer fish along the southern coast of Cape Breton county and the northern coast of Victoria county. These catches were so poorly cured that there was small demand, at low prices. Indeed, a portion of the catch had to be dumped after curing.

The herring catch was 26,132 cwt., having a value of \$26,028 or an increase of 3,801 cwt. and \$5,408 in value, as compared with the preceding year. There was, however, a great decrease in the marketed value of the pickled product. In 1921 the marketed value was \$90,226 as compared with \$45,244 for the past year. The increase in the catch was due to the heavy run of spring herring, and the decrease in the marketed value to the failure of the July run on the south coast, which is usually disposed of at about \$10 per barrel.

The catch of swordfish was 5,955 cwt., having a value of \$42,569 as compared with 4,160 cwt. and \$41,139 in 1921.

The salmon catch was 2,153 cwt., having a value of \$24,017 as compared with 1,781 cwt. and \$21,466 in 1921.

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District No. 2—Comprising Halifax county and the counties of Guysboro, Antigonish, Pictou, Colchester, Cumberland and Hants—Inspector Sutherland.

Total catch, 570,517 cwt., having a landed value of \$1,752,906, as compared with 1921 there was an increase in the catch of 61,279 cwt. and \$421,485 in value. The marketed value was \$3,081,463.

Favourable conditions were not general in this district.

While the portion of the district along the Northumberland straits, where lobster fishing is principally carried on, had a very successful year, with a large increase in catch and pack, Halifax and Guysboro counties, which support the largest number of fishermen, did not share very largely in this prosperity. The spring mackerel fishery was a success in these counties but the results were offset by lower prices and the failure of the fall mackerel fishery, owing to the fish keeping offshore. These conditions, combined with exceptionally low prices for cured fish, particularly pickled herring and mackerel, did not tend to make 1922 a success from the fishermen's point of view.

The outstanding feature of the year's operations was the lobster fishery of the Northumberland coast, and the increased mackerel and haddock catches on the Atlantic coast. Only in Halifax county west, and Guysboro county east could the lobster fishery be called a failure. Late drift-ice interfered with the fishery in Guysboro county.

The lobster catch was 63,709 cwt., having a value of \$494,061, as compared with 48,428 cwt., and \$243,057 in 1921. Along the Northumberland straits ideal weather conditions prevailed during the fishing season. In Antigonish county drift-ice prevented operations until early in May. During the year seventy-three lobster canneries operated and 28,763 cases were packed. The pack shows an increase of 7,891 cases over that of 1921. Prices to the fishermen opened at \$6 per cwt. and gradually increased until \$13 was paid in some sections toward the end of the season. The average price, however, was about \$7 per cwt. The pack was as follows:—

	Catch	Value	Pack	Value
		\$		\$
Halifax.....	6,590	66,966	1,446	44,640
Guysboro.....	9,770	76,678	3,345	113,878
Antigonish.....	10,309	83,373	5,176	152,992
Pictou.....	21,390	153,048	11,009	335,935
Colchester.....	60	420	25	790
Cumberland.....	15,590	113,576	7,787	235,574
	63,709	494,061	28,763	883,019

The cod catch was 180,403 cwt., having a value of \$326,869, as compared with 177,782 and \$287,075 the preceding year; or an increase of 2,621 cwt. and \$39,794. The catches were chiefly in Halifax and Guysboro counties, the largest catches being landed at Catch Harbour, Sambro, Terrence Bay, West Dover, Indian Harbour, Tangier, Jeddore, Canso, Liscomb, Drumhead, Mulgrave, Queensport and Whitehead.

The haddock catch was 121,950 cwt., having a value of \$234,668, as compared with 105,113 cwt. and \$208,045 the preceding year; showing an increased catch of 16,837 cwt. and \$26,623 in value. Forty per cent of the catch was taken offshore by steam trawlers landing at Halifax and Canso.

The mackerel catch was 75,095 cwt., having a value of \$342,624, as compared with 33,874 cwt. and \$222,523 the preceding year; showing an increase of 41,221 cwt., and \$120,101 in value.

The outstanding increase was in Halifax West, where 43,295 cwt. were landed. The increase was quite general, but was of the spring run chiefly. It is interesting to note that the catch was the largest for the past ten years.

The herring catch was 68,494 cwt., having a value of \$67,296, as compared with 90,957 cwt., and \$102,639 in 1921; or a decrease of 22,463 cwt. and \$35,343 in value. This decrease was due to small catches in Guysboro county from New Harbour to the Halifax county line. In Cumberland county there was an increase of about 3,000 cwt. The demand for fresh herring was poor, and prices for salt herring very low, consequently there was no great incentive to prosecute this fishery. The best price secured for pickled herring was \$4.50 per barrel, and toward the end of the year dropped to \$3.50. As barrels cost \$1.50 each it will readily be seen that the fishermen had little or no profit, to pay for salt, labour and transportation. Owing to these conditions hundreds of barrels were thrown back into the sea by the fishermen in Halifax county, and are not included in the catch. About 7,000 cwts. were smoked in Cumberland county.

The salmon catch was 4,587 cwt., having a value of \$58,605 as compared with 3,192 cwt., and \$54,028 in 1921; showing an increase of 1,395 cwt., or 44 per cent. Lower prices, however, prevailed than in 1921. Increased catches were made in Pictou county west, Antigonish and Halifax county west. In the first two counties the catch was nearly double that of 1921. For the whole district the catch has increased 167 per cent since 1920. The past year's catch compares favourably with the best catches the past ten years.

The shad catch was 485 cwt., having a value of \$6,487, as compared with 107 cwt. and \$1,845 in 1921. This fishery, which is confined to the headwaters of the Bay of Fundy, shows a fairly satisfactory recovery since the close season of 1918, and although there are no great possibilities, under present conditions, it is of considerable value to the Colchester and Cumberland county fishermen in the Bay of Fundy. It is doubtful if it will stand up under the present two months' open season.

The swordfish catch was 4,713 cwt., having a value of \$32,349, as compared with 1,594 cwt. and \$16,676 in 1921. Of the total catch 1,735 cwt., were taken off the coast of Cape Breton and landed in Halifax and Canso.

District No. 3.—Comprising the counties of Lunenburg, Queens, Shelburne, Yarmouth, Digby, Annapolis and Kings—Inspector Marshall.

Total catch 1,792,172 cwts., having a landed value of \$4,755,383, as compared with 1,520,569 cwt. and \$4,919,220 in 1921.

Operations in this district compared favourably with previous years. The fishermen availed themselves of every opportunity that broken weather afforded with the result that the quantity of fish landed shows a gratifying increase over the catch of the previous year. The Lunenburg fleet had an exceptionally good year. The landings of the 92 vessels totalled 900,000 cwts., or 127,125 cwt. in excess of 1921. The markets for the prepared products were, however, very inactive, with the result that the greater portion of the catch was unsold at the end of the year.

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The lobster catch was 62,099 cwt., having a landed value of \$1,096,709, as compared with 146,390 cwt., and \$1,755,231 in 1921. It should be pointed out that the large catch of 1921 was due chiefly to the especially favourable weather conditions during the regular spring season, and particularly to the special fishing season of six weeks from November first, during which over 30,000 cwts., were taken. The pack was as follows:—

	Catch	Value	Pack	Value
		\$		\$
Lunenburg.....	1,220	15,900	142	4,686
Queens.....	2,165	32,449	3	66
Shelburne.....	18,766	329,789	4,551	154,231
Yarmouth.....	29,671	511,429	7,874	258,221
Digby.....	8,922	169,322	1,294	43,850
Annapolis.....	1,175	33,320		
Kings.....	180	4,500		
	62,099	1,096,709	13,864	461,054

The total cod catch was 1,244,233 cwt., having a value of \$2,497,875, as compared with 1,077,581 and \$2,191,302 the preceding year. The largest landings were at Lunenburg, Liverpool, Lockeport, Shelburne, Yarmouth and Digby.

The haddock catch was 104,532 cwt., having a value of \$209,875, as compared with 72,049 cwt. and \$148,423 for 1921; showing an increase in the catch of 32,483 cwt., and \$61,452 in value.

The catch of hake and cusk shows an exceptionally large increase over 1921, the total being 142,767 cwt., having a value of \$114,364 as compared with 42,714 cwt. and \$32,139 in value the preceding year.

The mackerel catch was 53,071 cwt., having a value of \$328,677, as compared with 28,726 cwt. and \$217,251 in 1921.

The herring catch was \$88,512 cwt., having a value of \$94,357, as compared with 61,419 cwt. and \$67,429 in 1921.

The salmon catch was 1,837 cwts., having a value of \$46,310, as compared with 1,311 cwts., and \$33,837 the preceding year. The increase in the alewife catch was over 100 per cent, or 9,746 cwts., as compared with 4,304 in 1921. The increased scallop catch was particularly noteworthy—10,682 barrels as compared with 4,673 barrels in 1921. This increase was due to the catches in the recently discovered areas of the Bay of Fundy. The probabilities are that this fishery will increase, and afford most remunerative employment for an increased number of persons for many years.

In only two fisheries of the district was there a decreased catch. Pollock shows a decrease of 7,582 cwt. and halibut a decrease of 3,410 cwt.

NEW BRUNSWICK

The total catch was 1,551,377 cwt. having a landed value of \$2,705,783 as compared with 870,229 cwt. and \$2,218,439 the preceding year or an increase of 681,148 cwt. and \$487,344 as compared with 1921.

District No. 1—Comprising the counties of Charlotte, St. John, Albert, and the Bay of Fundy watershed of Westmorland county—Inspector Calder.

The total catch was 886,266 cwt., having a value of \$877,365, as compared with 454,323 cwt. and \$645,239 in 1921. The total marketed value of cured fish and fish products was \$1,639,091, as compared with \$1,363,049 the preceding year.

The lobster catch was 7,178 cwt., as compared with 9,012 cwt. for the preceding year, or a decrease of 1,834 cwt. The decrease was chiefly in St. John county. The Charlotte county catch was 5,745 cwt. as compared with 6,854 cwt. for 1921.

The cod catch was 41,435 cwt. as compared with 39,348 cwt. in 1921. The greater portion was landed at Chance Harbour, Dipper Harbour, Beaver Harbour, Wilson's Beach and Grand Manan. The haddock catch is decreasing each year.

The hake catch was 93,503 cwt., as compared with 38,426 cwt. in 1921. The large increase is not so much due to the increase in the run as it is to increased prices paid the fishermen. In 1921 the low prices prevented active operations. Dipper Harbour and Chance Harbour, in St. John county, and Beaver Harbour, Wilson's Beach and North Head in Charlotte county, are the chief centres of the hake fishery.

The herring catch was 157,001 cwt., as compared with 116,275 cwt. for 1921. The catch was almost entirely taken in the weirs at Grand Manan, where a large smoked herring industry has been developed.

The sardine herring catch was 244,553 barrels as compared with 152,300 barrels in 1921. While the catches in the weirs at Campobello and Deer Island were small, the fish were plentiful at Grand Manan. The fishery was, however, without a fair profit to the fishermen, as the average price was only about \$6 per hogshhead of five barrels.

In the report for 1921 it was noted that the scales of the herring used for smoking were being utilized by an American Company for the manufacture of a fine quality of artificial pearls. This industry is now permanently located at Grand Manan and afford a most remunerative market for the sale of the scales. \$15,000 was paid the fishermen last year. The company operating, known as The Marine Fish Products Company, after several years' experience in experimenting with the quality of the scales from the herring taken at the Magdalen Islands, and also at certain canneries at Lubec, Maine—discovered that the conditions at Grand Manan were the most favourable, as the scales could be readily secured in a clean, fresh state, within a few hours after the fish are taken from the water. The probabilities are that the operations of the company will be largely expanded, and with great advantage to the fishermen.

District No. 2—Comprising the counties of Restigouche, Gloucester, Northumberland, Kent and Westmorland—Inspector Crocker.

Total catch 706,386 cwt. having a landed value of \$1,803,695, as compared with 414,137 cwt. and \$1,531,543 in 1921; or an increase of 302,249 cwt. and \$272,152 in value.

The lobster catch was 62,376 cwt., having a value of \$567,039, as compared with 59,453 cwt., and \$321,735 in value in 1921. The demand for canned lobsters, and the large expansion of the live-shipped trade, resulted in greatly increasing the prices paid for the catch and explains the large increase in the value as compared with the previous year. The pack was as follows:—

	Cases	\$
Restigouche.....	293	8,805
Gloucester.....	8,664	253,745
Northumberland.....	5,487	157,205
Kent.....	6,121	171,972
Westmorland.....	5,512	181,971
	26,077	773,698

The cod catch was 270,277 cwt., having a value of \$306,908, as compared with 75,361 cwt. and \$118,264 in 1921, or an increase of 194,916 cwt. and \$188,644 over the preceding year. About 80 per cent of the catch was taken in the Caraquet districts of Gloucester county, where a fleet of about 140 small

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tonnage boats were operated. This fishery was prosecuted with much greater interest than in 1921, as the prices were more favourable.

The mackerel catch was 23,441 cwt., having a value of \$89,306, as compared with 20,911 cwt., and \$69,751 in 1921. While the Grand Anse district of Gloucester County was the chief producing centre, a large proportion of the catch was landed at Shippegan, where excellent facilities exist for caring for the catch.

The herring catch was 207,318 cwt., having a value of \$108,538 as compared with 135,975 cwt., and \$88,951 in 1921.

The alewife catch shows a marked increase over that of 1921, as the demand was much greater. The catch was 22,357 cwt., having a value of \$24,856 as compared with 5,165 cwt. and \$5,272 the preceding year.

The salmon fishery gave a decrease in quantity and a decrease in value, the catch being 13,697 cwt., having a value of \$163,904, as compared with 15,658 cwt. and \$300,978 in 1921, when the prices received by the fishermen were unusually high. In 1922 a considerable quantity sold as low as .06 cents per pound.

The smelt fishery shows an increase in quantity but a decrease in value. The catch was 62,650 cwt., having a value of \$451,844, as compared with 62,041 cwt., and \$519,488 in 1921. The catch was poor in quality and small in size, large quantities being disposed of at .03 cents per pound.

District No. 3.—Comprising the waters of the inland counties of Kings, Queens, Sunbury, York, Carleton and Victoria—Inspector Harrison.

The total catch had a value of \$24,723.

While the waters of this district are highly prized by sportsmen, there are several interesting commercial fisheries carried on, such as shad, pickerel, sturgeon and whitefish. The shad fishery is again falling-off since the reopening of the fishery after the close period, and it would appear that the fishery should be closed for another period of years or extinction will soon follow. The catch the past year was only 1.224 cwt., valued at \$7,344, as compared with 2,055 cwt. and \$20,550 in 1921. The pickerel catch was 24,200 pounds, sturgeon 11,100 pounds and whitefish 1,500 pounds. Caviar, or sturgeon roe sold at \$1.50 per pound. The salmon catch was 42,400 pounds.

The fisheries of these waters, by their very nature, are subject to conditions that do not obtain in the regular commercial fisheries. Weather and water must needs be favourable, particularly with respect to the salmon fishery, in order that fish may ascend the rivers to the spawning areas.

The superintendent of the Tobique Salmon Club reported an unusually large run of salmon the fall season. He writes:—

“I am puzzled about the big run of large salmon that appeared in the lower part of the Tobique the last week in October. For about eight miles up the river was full of them. They made their beds and spawned there. There were no fish there until the time I mention, and salmon will never come down the river to spawn. When my wardens called my attention to them I made several trips there to watch their movements. They spawned and covered their beds on the 2nd, and 3rd of November—the latest I have ever known salmon to spawn. The salmon that had spawned at the head waters were passing out of the river when they (the late ones) were on their beds. The fish were so dark coloured that I did not think they were fresh from the sea. I am inclined to believe they were somewhat late in arriving at the mouth of the Tobique, and remained there on account of the very low water, but why were they so late in spawning? You may know something about this run of fish”.

The explanation of this unusual run may be that the very low water conditions prevailing during the summer may have hindered the ascent of salmon, and therefore when they reached the mouth of the Tobique they were close to the spawning period and ascended the cooler waters for this purpose.

PRINCE EDWARD ISLAND

Total catch 198,243 cwt., having a landed value of \$904,659, as compared with 152,591 cwt. and \$468,791 the preceding year. The marketed value was \$1,612,599 as compared with \$924,529 in 1921.

The lobster catch was \$87,583 cwt., having a landed value of \$651,449, as compared with 63,816 cwt. and \$255,264 in 1921. The fishery was prosecuted with great activity and success. Over 69,000 more traps and 25 more canneries were operated than in the preceding year. It will be noted from the following statement that the value of the pack,—\$1,267,731 was about 30 per cent greater than the landed value of the total catch for all varieties of fish. The pack was as follows:—

	Cases	\$
Kings.....	16,329	481,294
Prince.....	17,467	531,202
Queens.....	8,424	255,235
	43,220	1,267,731

The cod catch was 31,493 cwt., valued at \$44,069; a decrease of 1,829 cwt. as compared with 1921. The demand was poor and the prices of supplies high, consequently little general effort was made to engage in the industry.

The mackerel catch shows a small decrease, 7,729 cwt., as compared with 8,204 cwt. in 1921. The spring run was a failure to the netmen, although a considerable quantity were taken by hook and line.

The herring catch was 39,407 cwt., having a value of \$48,528, as compared with 30,441 cwt. and \$32,874 in 1921. The spring catch in the district from Morell to East Point was insufficient to supply bait for the lobster fishermen of that district and supplies had to be secured from the Magdalen Islands. On other portions of the coast the supply was adequate.

The smelt catch was 9,442 cwt., having a value of \$64,879; showing a decrease of 1,040 cwt. and \$2,042 as compared with 1921.

The oyster catch shows an increase of 1,419 barrels over the preceding year, or 5,211 barrels, valued at \$34,525, as compared with 3,792 barrels and \$25,669 in 1921. East and West rivers and tributaries, and also Vernon, Seal and Pownal rivers are well stocked with young oysters, with the probability that there will be increased catches in 1923. In the Richmond bay district the areas appear to be recovering from the blight of the past eight or ten years. The outlook for Grand river particularly, is good. The Orwell river beds were not fished, as the oyster meat showed a greenish tint and it was feared by the fishermen and buyers that the beds were diseased. An examination, however, showed that the tint was the result of local food conditions, and the tint, instead of having a detrimental affect on the quality, was of distinct advantage, as oysters of this character are highly esteemed by epicures, as the meat is usually plump and palatable.

Large districts of formerly heavy producing areas are so badly silted that the spat cannot catch. Alberton bay and adjacent districts are now barren. Oyster culture work is much needed, and it is hoped that early attention may be given to the revival of the oyster industry, not only in Prince Edward Island, but also in Nova Scotia and New Brunswick, where the possibilities of developing a large and profitable industry are excellent.

MAGDALEN ISLANDS

Total catch 266,904 cwt., having a landed value of \$412,513.

The islands were included in the Atlantic Division for the first time last year, and placed under the supervision of Inspector Gallant, with two efficient resident officers, Messrs. Arsenault and Chiasson, who are both supplied with motor-boats and give their whole time to the work.

The four chief fisheries are the lobster, herring, mackerel and cod, and are carried on with the following results:—

The lobster catch was 26,258 cwt., having a landed value of \$147,888, or an increase of 1902 cwt. and \$50,464 as compared with 1921. The pack was 12,943 cases, valued at \$379,048 as compared with 12,178 cases and \$272,313 the preceding year.

The herring catch was 135,246 cwt., having a landed value of \$41,239. The catch for 1921 was 103,938 cwt., valued at \$51,969. The market for the pickled product is very small, with the result that the greater portion of the catch has to be disposed of for bait, and the demand for such use has greatly decreased the past few years.

The cod catch was 27,660 cwt., having a value of \$41,482 showing a small decrease as compared with 1921.

The mackerel catch was 50,010 cwt., valued at \$166,455 as compared with 22,858 cwt. and \$91,432 in 1921, showing an increase of 27,152 cwt. and \$75,023 in value. In the first and second weeks of June a very large catch was obtained. As the facilities for taking care of the catch was poor the quality of the cured product was inferior, with the result that it had to be disposed of at a low price. A considerable quantity was taken with hook and line, for which good prices were realized.

Improved transportation connections with the mainland, and lower freight rates are greatly needed. Until such are secured little or no improvement in the fishing industry can be expected.

INLAND AND RIVER FISHERIES

With the exception of a few districts the conditions affecting the inland fisheries are improving. Especial attention continues to be given to the prevention of pollutions and obstructions, and while it is quite impossible to afford adequate protection and supervision of the multitudinous rivers and lakes in the division, the results are fairly satisfactory, with the probability that increased catches will be taken by netsmen and anglers.

In Nova Scotia the anglers had a good year. On the St. Mary's, Guys-boro county, both netting and angling shows a decided improvement. One angler captured 55 salmon. Conditions on the Medway, Queens county, were more satisfactory than for some years.

The fall run of salmon was exceptionally heavy in all the rivers frequented by the fall run of fish. There is a growing demand that a special fishing season should be provided for the capture of these fish. East River, Sheet Harbour, Halifax county—one of the best salmon rivers—is being taken over by the Nova Scotia Power Commission to supply hydro power for Pictou county. A number of dams will be constructed during the coming summer; the one at Malay's falls, immediately above the finest pool on the river, will be the chief obstruction. While fishways will be constructed through all the dams in the main river there is little doubt but what the salmon run will be greatly interfered with, and this river as well as West river, Sheet Harbour, which supplies power for the Sheet Harbour Lumber Company, will cease to be considered one of the important salmon rivers.

In New Brunswick there was a heavy June run on the Miramichi and Restigouche, with the result that the head waters were well stocked. Fly fishing was excellent. The fall run was exceptionally heavy. In the netting district of the Miramichi the destruction of salmon by the constantly growing seal herds is a menace to the fishery and difficult to overcome.

On the St. John river and tributaries water conditions prevented successful angling. On the Tobique the anglers had a successful season.

Trout fishing was good throughout the whole of the Maritimes and afforded excellent opportunities to the large sport loving population.

FISHERIES PROTECTION SERVICE

During the past three years this service has been undergoing a thorough revision. Previous to the organization of the Atlantic Division for the purpose of closer and more economical supervision, there were thirteen boats owned by the department and in addition, five ships of the Naval Department, employed in Fisheries Protection service.

As this service was quite expensive and not wholly satisfactory, it was determined that in all suitable localities the fishery officers should be required to furnish motor-boats as part of their essential equipment, for the purpose of more effectively patrolling the waters of their districts. This policy is being gradually extended and perfected; thus relieving the department of the necessity of maintaining many of the patrol boats. As a consequence, three more of the boats will be disposed of the coming year. Only five boats of the original thirteen of the smaller craft, and two of the five Fisheries cruisers will be maintained.

The cruiser *Arleux*, Captain Milne, has the Bay of Fundy and Western Nova Scotia district, and the cruiser *Arras*, Captain Barkhouse, the remainder of the Atlantic coast waters of Nova Scotia, and also the Northumberland straits. Both ships, however, can be used on any part of the coast, when considered necessary. The following are summaries of the work performed by these vessels:—

Arleux

April 20, cruised the western division watching United States fishing craft; in the Bay of Fundy searched the sardine carriers to ascertain that they carried no fishing nets, etc. Searched the Bay of Fundy shores for breaches of the lobster fishing regulations, seining for herring, and the use of dynamite in capturing herring and pollock, carefully watching the fishing boats during the Sunday close season.

May 10, mackerel scouting on Brown's Bank, observed the advance schools of mackerel arriving on the eastern edge of the bank; followed these schools as they proceeded westerly along the coast showing intermittently.

June 15, at Canso following the United States seiners en route to home ports.

June 27, cruised the Bay of Fundy in search of illegal lobster fishing, destroyed a number of traps illegally set; also watched the large number of boats drifting for salmon off St. John county.

July 13-15, locating the distance off shore of the beds on which the boats were fishing scallops off Digby and Annapolis counties. On the 26th returned to the shores of southern Nova Scotia waiting for the incoming droves of sword fishermen from the United States and assisting the local fishery officers as required.

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August 1, received orders to proceed to the Northumberland straits and the northern shores of New Brunswick.

August 12-15, at Magdalen islands. On return to the mainland cruised the fishing grounds from Chockfish river to Caraquet and along the northern shores of Prince Edward Island. In this district a determined effort was made to fish lobsters during the close season. Destroyed a large number of traps illegally set and by remaining on the fishing grounds day and night prevented their illegal operations, causing them to discontinue same. Remained at these duties until October 7 when the ship returned to her station west of Halifax to follow the United States seining vessels catching the fall run of mackerel along the Nova Scotia coast.

October 23 to November 3, calibrating the wireless direction finding stations at Chedabucto and Red Head.

November 4, proceeded to the counties of Annapolis and Digby searching for illegal lobster fishing and new scallop beds. On the 10th obtained the loan of a scallop drag and dragged along Digby neck. On the 11th located a scallop bed off Whale Cove and another off Centreville. This latter proved to be the best scallop bed yet found.

December 4, proceeded to the southern shore of Nova Scotia watching a large number of United States fishing vessels that were using Shelburne as a base of operations, also standing by to assist the Lockport fishermen if required.

December 19 until the time of laying up, cruising the southern shore of Nova Scotia assisting vessels in and out of the harbour obstructed by ice.

On January 11 the ship was laid up and the crew discharged.

Arras

The *Arras* was commissioned at Halifax, N.S. on April 1, 1922, and on April 3 proceeded to sea on patrol work on the western coast of Nova Scotia, the ship cruised, on the west coast of Nova Scotia until May 1, then we proceeded to the vicinity of cape Sable and took up the duties of mackerel scouting. The first mackerel was sighted on May 10, we then followed the fish as they worked east along the coast, reporting all movements of fish to you.

The ship followed the fish to bay Chaleur where the last schools were sighted on June 22.

The ship then proceeded on her cruising station on the eastern division, keeping in close touch with all fishing vessels working on the coast.

On July 1 the ship was taken from the Department of Naval Service and placed under the Marine and Fisheries Department.

The ship was kept cruising on her station until August 9, we then proceeded to Louisburg to watch the American sword fishermen working along our coast. The ship remained with the swordfishing fleet until September 5 when the last vessel left our coast. We then proceeded west with the swordfishing fleet to cape Sable, then we returned east along the coast keeping close watch on all American fishing vessels.

September 20 we proceeded to Prince Edward Island waters to watch the American mackerel seiners during the fall fishing season. We cruised on our station until October 15. We then proceeded to Canso to calibrate the D. F. Station; we then proceeded on our station until December 4 when we were ordered to Canso, N.S. to protect the Canso fishing vessels during the winter haddock fishing season. We remained with the Canso fleet until January 10, 1923, we then proceeded west and took up station on the west coast of Nova Scotia, assisting the fishing vessels and in keeping the ice broken in Lockport

harbour. We cruised on the western station until February 28 when the ship was laid up at Liverpool and all crew paid off except the captain, chief engineer and boatswain and oiler who were kept on for watchmen.

On March 28 the ship was taken in hand by the contractors for her annual refit.

We had very little illegal fishing on our station during the year. We always kept in close touch with American fishing fleet and watched every water where the Americans fish.

During the year we had 79 American fishing vessels on our station which we boarded and examined 142 times.

We had 26 American swordfishing vessels in our waters and 85 Canadian swordfishing vessels. These vessels came from all parts of Nova Scotia and made headquarters at Louisburg during the swordfishing season.

During the year we steamed 12,699 miles and were at sea 1,402 hours and consumed 1,201 tons of coal.

THE LOBSTER FISHERY

The importance of the lobster fishery is becoming increasingly apparent, as is evidenced by the unusual activities of both fishermen and packers. It is the most highly prized, and most vigorously prosecuted, of any of the fisheries of the Atlantic coast, as it affords most remunerative employment, and ready returns, to a large number of persons. Last year, 13,445 fishing licenses were issued, as follows:—

Nova Scotia.....	11,252
New Brunswick.....	2,609
Prince Edward Island.....	1,831
Magdalen Islands.....	374

About 1,210,000 traps were operated. The number of canneries in operation was 546. The total catch was 357,632 cwt., having a value of \$3,580,450. The total pack was 145,779 cases, valued at \$4,433,154 as compared with 130,469 cases and \$2,822,040 in 1921, or an increase of 15,310 cases and \$1,611,114.

The market for canned lobsters was active, practically all the supplies being exhausted within the first three months, resulting in unusual preparations by the fishermen and canners, and in exceptionally high prices being paid for the catches and pack of the early spring season, which opened in western Nova Scotia March first.

The demand continued strong throughout the year. The increase in the number of fishermen and in the traps operated was the greatest for any single year in the history of the industry. The June catch in the Cape Breton district from Pleasant bay to Margaree harbour, Inverness, was over five times greater than for the same month of 1921. In Cumberland county the increase in fishermen and quantity of gear used was about 200 per cent, and the number of canneries in this county increased from six to eleven. The unusual activities resulted in many instances in the available supply of fish becoming exhausted before the end of the various fishing seasons. It should be noted that similar conditions also obtained in New Brunswick and Prince Edward Island.

The one sore spot was western Nova Scotia, particularly the consistently large yielding district of Yarmouth and Shelburne counties, where the decrease in the catch and pack was over sixty per cent, which may be attributed in part to the large catches taken during the special fishing season of the fall of 1921, and in part to the fact that the weather conditions prevailing throughout the spring fishing season were not nearly as favourable for successful operations as prevailed the previous spring.

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The decrease for western Nova Scotia was 17,000 cases, that for Yarmouth being 6,758 cases and for Shelburne 7,040 cases. Notwithstanding this extraordinary decrease the total pack for the whole province shows a decrease of only about 3,750 cases.

The present regulations require revision, as the conditions in some districts have greatly changed the past few years. It is probable that the revision will take place the coming year, and will needs be made with great care, as the problem is a most vexed one, since a satisfactory re-arrangement of the fishing divisions and seasons is difficult. In any event the preservation of the industry should have first consideration.

THE DRIED FISH TRADE

Attention has been called in previous reports to the failure of our dried fish trade to hold certain important export markets, particularly Cuba. The Trade Commissioner for Cuba, Mr. G. R. Stevens, reports that the quantity of cases of dried fish exported from Canada dropped from 80,137 cases of 100 pounds in 1921 to 34,127 cases in 1922. Since the war Norway is regaining much of the trade formerly held by that country, notwithstanding that every advantage is with Canada, as Norway is several thousands of miles further from Cuba than Canada, and is forced to rely on a monthly steamship service, with much heavier freight rates.

The commissioner states that there are only two influences favouring Norwegian fish, and of these only one is important. The lesser advantage of the Scandinavian fish lies in the willingness of some Norwegian exporters to forward fish upon consignment. This is an attractive method of merchandising for the importer, and with reliable consignees, the returns from such shipments will probably be satisfactory. But consignment business in almost any line of export tends to run itself into the ground, and it is particularly apt to do so in Spanish-American countries. On the other hand, some of the Norwegian shippers are demanding more stringent terms of payment than the Canadian shippers, and although their fish keep no longer, is not better packed, nor superior in any way except appearance, they are beginning to command the market. The reason and its solution are simple; the Canadian shippers have been trying to make Cuban importers buy black nape fish; and they will not touch black nape codfish while white nape are to be had.

The difference in price between the white nape fish and the black nape is 50 cents per hundred pounds, and there is every reason to believe that Canadian fish need not undersell Norwegian fish if the black nape is removed, but can drive them from this market through advantages of freight and proximity, and at the same time obtain higher net returns for the Canadian exporters. The Cuban agents of the Canadian fish exporters, the steamship companies which carry the fish, and many foodstuff distributors believe this, and they are really in a position to know.

The Lunenburg dealers have taken a favourable view of the representations of the Trade Commissioner and it is quite probable that white-naping will be adopted the coming year.

COURSE OF INSTRUCTION

The third annual instructional conference of fishery officers of the Atlantic coast was held at Shediac, N.B., beginning September 20.

Four addresses on "Sanitation in Lobster Canneries" were given by Dr. A. P. Knight, Chairman of the Biological Board. These addresses were most timely, as the revised regulation governing the subject had recently been adopted after close investigation by Dr. Knight and his assistants.

The lobster fishing and canning industry of the Maritime provinces is valued at about seven million dollars annually. Efforts to improve the quality of the canned product and to ascertain the best methods to be adopted to avoid discoloration of the contents of the tins have been under investigation by the department for some years, as the annual loss to the dealers and exporters has been heavy. The systematic and persistent experiment and investigations, under the leadership of Dr. Knight, were taken up some three years ago, and as the result of the adoption of many of his suggestions, a very decided improvement in the quality of the goods has taken place.

The lectures and demonstrations given at the conference on the need of providing the highest possible sanitary equipment of the canneries, and methods of packing and processing, elicited the keenest interest and debate, and will be of undoubted value to the officers in administering the provisions of the Meat and Canned Foods Act and regulations.

The addresses by Dr. Huntsman on "Conditions in the Water," and "How Typical Food Fishes Live," were unique not only in the method of presentation, but also for the manner in which they were illustrated.

Without doubt, the addresses and demonstrations given by Doctors Knight and Huntsman, with the assistance of Andrew Halkett, the naturalist of the department, were the most systematic, important and interesting ever given in Canada for the training of fishery officers.

The conference was of a most serious mind, and the intentness with which the work was followed gave evidence that the officers fully appreciated the need of the special training being given.

The second part of the program dealt with "Administration" and "Methods of Work," and was confined wholly to discussion and interpretation of the provisions of the regulations, and better methods of supervision and protection. The presence of W. A. Found, Assistant Deputy Minister, was much appreciated, and his addresses not only to the point but highly illuminating.

Special emphasis was placed on the attitude that should be taken by the officers in dealing with the fishermen and others engaged in the industry. Co-operation, encouragement and good judgment were shown to be essential qualifications for efficient service. Happily the past few years a much better understanding has been arrived at, as the officials and the trade have come to the conclusion that their interests are identical. The encouragement of the industry and the betterment of the trade must always have first place. The regulation of the fisheries and the enforcement of the laws are matters largely of detail in conservation and protection, but are both of great importance if the industry is to be wisely administered. Without adequate knowledge of actual conditions and the requirements of the industry, confusion is bound to result. It was urged, therefore, that it is important that the officers should be in a position to intelligently discuss any problems that might arise, in order that the department may be advised as to the best methods to be adopted in the regulation and administration of the fisheries of the Maritime provinces.

SPECIAL MATTERS

(1) *Mackerel Seining*.—For some years past the American fishermen have had a considerable fleet of mackerel seiners operating off Nova Scotia coast with considerable success, and this fleet was augmented by a number of additional vessels the past year.

Little or no effort was made by the Nova Scotia fishermen to engage in this industry until the past year, when the following vessels, outfitted for

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mackerel seining: *Helen G. McLean, Helen M. Coolen, Douglas B. Conrad, Nellie Banks, Yafico, D. C. Mulhall, National II* (gasoline), and *Lemberg* (steam trawler).

In addition three purse seines were operated from small boats in the Halifax district.

The opportunities for large catches were not as favourable as usual as the mackerel schools skirted the coast close to the shore, to the advantage of the net fishermen but to the disadvantage of the seining fleet, as such fishing is prohibited within the three mile limit. Several of the Nova Scotia fleet made very good catches, particularly the *Helen G. McLean* and the *Helen M. Coolen*.

(2) *Transportation*.—The handling and marketing of the large supplies of mackerel taxed the ingenuity, often the patience of the dealers, as the transportation facilities were poor, particularly along the south coast to Yarmouth, where the conditions were most unsatisfactory. Shipping by the Halifax and Southwestern Railway is a gamble, as the rails and roadbed are too light and poor for heavy shipments, with the result that large quantities of fresh mackerel arrived in Yarmouth too late to make steamer connection for Boston.

In the extended and valuable coastal fisheries district from Halifax to Guysboro, the lack of suitable transportation severely handicaps the industry and offers little hope for development of the fisheries of the district. A railway line, or more adequate steamship service, is essential.

(3) *Cold Storage*.—The fishermen of Cape Breton have been handicapped by a lack of proper cold storage facilities. A company has been organized at North Sydney and the work of construction of the plant is now under way and it is expected that the plant will be ready for business in the early spring; 165,000 cubic feet of space will be devoted to fish storage.

The Universal Fish Company constructed a general fishing plant at Hubbards, Lunenburg, with the intention of operating a fleet of six vessels for halibut fishing, mackerel seining and salt fishing.

At Shippegan, N.B., the Monarch Cold Storage Company have converted the dog-fish plant, formerly owned and operated by the department, into an ammonia process freezer. The fish are conveyed by endless belt some 600 feet from the wharf to the freezer. This plant is valued at \$25,000. Shippegan is well equipped in this respect, having five cold storage plants.

(4) *Improved Canning Conditions*.—About thirty new lobster canneries have been constructed, nineteen being on Prince Edward Island, where also 16 canneries have been thoroughly reconstructed or otherwise renovated. The quality of the pack continues to improve, as a result of the investigations and educational campaigns carried on the past three years. The revision of the regulations, which will probably be completed the coming summer, will further assist in improving the pack, as special provisions contemplate requirements with respect to sanitation and equipment that will bring canning operations to a high standard.

(5) *New Markets*.—Several of our firms have shown great enterprise in endeavouring to open new markets for our fish products, both in Canada and in foreign countries. Experimental shipments to distant ports hitherto untouched were encouraging. It is apparent, however, that any real success depends on preparing the products in such manner as to meet the peculiar demands of the trade.

The retention or development of the foreign markets for dried and pickled fish has not been an easy task, as the general disruption of trade, due largely

to the exchange situation, has been an unfavourable governing factor. And in addition, the endeavours of competing countries to dispose of large stocks has added to the difficulties of our merchants.

APPRECIATION

Appreciation of the earnestness with which the officers have performed their duties is a gratifying privilege. The work was fully up to expectations. While the organization of the Atlantic Division followed the termination of the great war, with all the vexing problems involved in a return to peace conditions, our officers have quite generally exercised a wholesome spirit of co-operation with those engaged in the various branches of the fishing industry.

MACKEREL SCOUTING, 1922

Report by Captain Barkhouse of C.G.S. "Arras"

SPRING

Mackerel were located in the channel between George's bank and Brown's bank on May 10. This body of fish was moving slowly northward and approaching the southwestern edge of Brown's bank, they were very wild and only showed at short intervals. The same evening another school was located on the western edge of Brown's bank; this latter school was 68 miles southwest magnetic from Cape Sable. All the above fish were halted in their northerly migration by strong northerly winds, which caused them to work around the southeastern end of Brown's bank and approach the Nova Scotia coast in the vicinity of Cape Negro.

The weather then became unfavourable and fish were not located again until May 16, when a large body was sighted coming in between Brown and LeHave banks. These fish were showing on a frontage of four miles. The following day this body was scattered and formed in many small schools on the western edge of Brown's bank and in the channel between LeHave and Brown's bank.

On the 19th a large body was sighted 10 miles west of Seal island. This body was working fast up the west coast of Nova Scotia and the first catches were made in the traps at Cranberry head on May 20.

The first body approached the coast near Cape Negro and the first catch by seines was made by the trawler *Surf*, which filled up on the night of May 23. These mackerel followed the coast line right to Prospect, where on the 26th and 27 large hauls were made in nets and traps. On the 30th the fish were on Sambro bank and American and local seiners were filling up. These fish held the coast and large catches were made by seiners and shore nets.

On the 5th of June the fish had reached Northern Cape Breton waters and many were taken at Ingonish. They took the channel between Cape North and St. Paul's island and went on towards Magdalen islands, where many were caught on the 16th. The last schools were sighted between Magdalen islands and the north side of Prince Edward Island. The fish then stopped schooling and apparently went to the bottom. It was seen that all nets set near the top of the water produced no fish whilst those set towards the bottom were very successful. On the 20th between Miramichi and Miscou island 125 sail boats were taking mackerel with hook and line. We then cruised between Anticosti island and Gaspé but no fish were sighted.

On June 19 I examined fish taken at Malpeque. They were only partially filled with spawn, but the fish taken by hook and line off Miscou on the 21st showed no spawn at all.

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This year the mackerel were much nearer the coast line than previously. This, I think, is in a large measure due to the immense quantities of mackerel feed, a small fish known to fishermen as "All Eye", which was on the coast this year. This is the first year since 1906 that these small fish have been seen in large quantities, and in the above named year mackerel frequented our harbours practically the entire summer.

The waters of Halifax and Guysborough counties were this year covered with a slimy substance, which greatly interfered with nets and seines. It is not known what caused this slime but it was observed that the mackerel feed previously mentioned was mixed in with it and in all probability fed on it.

It may be pointed out that there is a greater interest being developed in mackerel fishing. This is evidenced by the fact that this year seven Canadian seining vessels and one Canadian trawler operated on our coast. This is the largest number of purse seining vessels that have ever operated here and I think the interest now being displayed by our fishermen is largely due to the efforts of the department.

All the vessels kept in close touch with us and received all the information we were in a position to give them.

FALL

The migration of mackerel from the lower Gulf of St. Lawrence towards southern waters was carefully noted this fall, as this was the first time the work has been undertaken by the department I gave all my time and experience to the work.

We have discovered that the mackerel move, after schooling, in large waves or bodies. This fall the mackerel moved out of the St. Lawrence in three waves and about two weeks apart, the mackerel during the time of each wave passing were showing in small schools on a radius of 40 miles along the coast.

The mackerel were first noticed schooling on August 25 between East Point P.E.I., and Magdalen island. The first large body of mackerel moved very rapidly and passed out of the Gulf between cape North and St. Paul's island, following the coast of cape Breton it passed Scatarie island September 2 and moved west along the Nova Scotia coast. Large catches were taken in Chedabucto bay, St. Margarets bay and off Liverpool. We followed this body of fish as far as Shelburne and then returned to the lower St. Lawrence.

The second large wave or body of mackerel moved out of the gulf on September 15, this body of fish was slower in moving along the coast. Part of these mackerel passed south through the strait of Canso, but the largest body passed out between cape North and St. Paul's island. These fish held close to the shore and large catches were made as they passed along the coast at Chedabucto bay. Boats along the coast of Nova Scotia did very well.

The third and last large body of mackerel passed out of the gulf on October 11. This body of fish was first sighted on October 2. It seemed very slow in moving. We followed this body along the coast as far as cape Sable where the last fish were sighted on October 28.

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, CENTRAL
FISHERIES DIVISION, 1922

I have the honour to submit my annual report on the fisheries of the Central Fisheries Division for the year 1922.

A decrease in production for the year 1922 will be noted, which may be ascribed, to a great extent, to the long open fall and early part of the winter fishing season; ice sufficiently strong to allow of the fishermen carrying on operations from the ice, not forming until well on into December. This undoubtedly caused a very considerable reduction in amount of fish produced.

In the province of Alberta, northern portion, which contains the commercial fisheries, conditions have not altered greatly from those reported last year. The prices obtained for the catch, and the market for same being about the same.

The operations at lake Athabasca which were reported in 1921, as having been commenced, were not carried on this season. Difficulty in obtaining a market for the product of the cannery, uncertain transportation and difficulty in placing the product on the market being the chief reasons for the stoppage of operations, and until these two difficulties are overcome it is hardly possible that success can be obtained in these operations.

Winter fishing operations in three restricted areas on Lesser Slave lake have been carried on this year for the first time, and as far as can be judged at the close of the year had been successful; though a considerably higher proportion of whitefish were taken during the operations than had been anticipated. Request was made that further areas be opened to like fishing, which, however, the department could not see its way to grant. I am of the opinion that sufficient areas are now open to meet the demands of all who desire to carry on winter fishing. The present areas are available to all with but short distances to travel and are located close to shipping facilities. Lesser Slave lake is the best producing lake in Alberta taking it from year to year, while fished as close to the line of safety as is considered wise, there is never any danger of depletion and if fishing in these waters is continued on the same basis as at present, and under the same regulations, there will be an unfailing supply of marketable fish of the first class for years to come.

The Buffalo lake fisheries have not been fished so heavily this year, the cost of getting out the catch is a drawback to these fisheries.

In southern Alberta there is an increased interest shown in the protection of the streams containing sporting fish, the closure of a number of the streams in past years is now showing its effect, many of the streams which two or three years ago were considered depleted now being well stocked. The two southern districts have been thoroughly patrolled during the past year, and it is pleasing to know that at last people are beginning to realize the value of these streams and to co-operate with our officers in every way to afford them protection. Well meaning persons demand the employment of fishery guardians wherever they think they are needed, losing sight of the fact that it would be an impossibility to have special guardians on each and every stream owing to the expense incurred. There can be no doubt however that the protection afforded these streams during the past year has been good in every way. That there have been many less violations the past year, taken with the fact that there was a large increase in the number of angling permits issued, will go to prove that the fact that these streams are receiving protection is recognized by the general public.

In the province of Saskatchewan while the total catch shows a decrease from last year, the value is greater, owing to the higher prices obtained for the fish. Open weather in the month of December had its effect in decreasing the

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catch considerably. No changes of importance have taken place in connection with the fisheries of this province during the year; they are in a healthy condition and are now back to normal, after three or four years of unsettled condition caused by bad markets. Every, and sufficient protection is being afforded the fisheries of Saskatchewan under the administration of the present staff.

The province of Manitoba shows a considerable decrease in catch during the past year. Here again the open winter at the start of the season had a great effect. The summer whitefishing in Lake Winnipeg was not successful, being very disappointing to the fishermen, the catch amounted to 24,476 cwts. as against 29,660 cwts. last year. The decrease cannot be put down to depletion, but rather to natural causes. There were long and continued storms during nearly the whole of the fishing season, when the fishermen could get on the grounds they could not find the fish; apparently the fish had sought new feeding grounds, and when they did come back to the usual grounds it was only in small numbers and late in the season. The water in lake Winnipeg was from two to four feet higher than for many years past, and this may have had something to do with the movements of the fish, inquiries show that this condition has obtained at different times in the past. On the other hand pickerel have not been so plentiful in these waters for many years past. An extension of the whitefish season was requested but it was not considered desirable to grant it.

The restrictions against fishing in Sturgeon bay, which has hitherto been a reserve for hatchery purposes, was taken off, owing to its being thought that the coarsefish were increasing to an extent that threatened the whitefish supply. Operations here commenced in December and up to the end of that month would not indicate that the coarsefish were as plentiful as had been thought. The catch being reported very light. The opening of these waters should to some extent relieve the pressure on lake St. Martin, which in my opinion should be closed to all commercial fishing operations for a period of not less than three years, in order to allow it to become stocked again. There can be no doubt of this lake being depleted, the fisheries have been going back for the past two or three years, this matter is now being investigated and a report with such recommendations as may appear necessary will be made.

Winter fishing at lake Winnipegosis was below the average of last year, though the summer fishing was good. I have at different times received complaints that the use of small meshed nets in certain parts of this lake was prevalent, a thorough investigation tends to show that these reports are much exaggerated and that there are no good grounds for them. In one area, in which it was stated that there were dozens of these small meshed nets was visited by an overseer from another district. He examined a large number of the nets found set in different parts of the area and found none at all of illegal mesh. This is getting a long way towards getting proper observance of the regulations by the fishermen, and I think that I may say that they are beginning to realize that it is as much to their own interests to use legal nets as anything can be. In places where we have had nothing but opposition in enforcing the regulations in regard to the use of legal meshed nets it is found that those who were most opposed are now willing to help our officers, and make no objection to stating that the department did them the best turn possible when it insisted that the use of nets of illegal mesh be put an end to.

The catch from Lake Manitoba during January and February, 1922, was shipped green, commanding a high market price on the United States market. The winter fishing this year from November 15 to December 31 was somewhat disappointing, owing to the late forming of the ice, and after that another breakup, so that it was rather late before fishing operations got under way, when the catch was not as good as expected.

Indications are that the fishery business in the provinces comprising the Central Fisheries Division has got back to a normal basis with a steady demand for the fish, and with good prices. Inquiries made show that the stocks of frozen fish on hand are sufficient to take care of the trade until the summer fishing commences, and that practically none of this frozen stock will have to be held in storage.

Observance of the fishery regulations has been enforced by the several fishery officers with firmness, but at the same time with a view to imposing as little hardship on the fishermen as possible. Taking into consideration the extent of territory covered by this division, it may be said that generally the regulations are well observed. There are one or two points which are exceptions, but they are gradually being brought into line.

There appears to be a greatly increased tendency towards asking for extensions of the fishing season. In many cases of this nature there is no reasonable ground for such a request, and I think that the action is not started by the fishermen themselves, but by those who are either interested in handling the catch, or to whom the fishermen may be indebted, and who hope by getting an extended season to clear off some of the liabilities.

I am pleased to report that the officers of this division have performed their several duties in a satisfactory manner.

REPORT OF CHIEF INSPECTOR, MAJOR J. A. MOTHERWELL,
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA)
FOR 1922

SALMON

The total pack of all varieties of salmon in the province of British Columbia during the year amounted to 1,290,326 cases, as compared with 603,548 cases in the year previous and 1,616,127 cases in the year 1918. In only four years since 1894 has this total pack been exceeded in the province. By referring to statement No. 1 it will be observed that the total pack of sockeye, the most valuable variety, amounted to 299,614 cases against 163,914 in 1921 and 276,459 cases in 1918. The pack of this variety on the Fraser river exceeded that of the previous year by 12,844 cases and the brood year four years previous by 31,895 cases.

The quantity of sockeye taken by the Americans on Puget sound from the run as it was passing through American waters on its way to the spawning grounds of the Fraser river amounted to 48,566 cases, which, including the pack on the Fraser river, resulted in a toll from the Fraser river run of 87,310 cases as against 67,572 cases in 1918. The fishermen of Puget sound usually account for approximately 75% of the pack of sockeye taken from the run heading for the Fraser river and the Canadian fishermen have to be satisfied with the remaining percentage although the salmon are hatched in Canadian waters and the Canadian Government has spent in fish cultural operations large sums of money each year for the purpose of keeping up the run. During the year 1922 the catch of the Canadians equalled that of the Americans but this was due to the unusually small amount of fishing equipment operated in Puget Sound compared with other years.

This year's pack of sockeye on the Fraser was the largest since the year 1917 when 123,614 cases were put up but even this amount is infinitesimal in comparison with the pack of previous years especially the fourth or "big" year when as many as 990,313 cases were canned in one year, in 1901, and in an off year following the previous "big" year as many as 293,477 cases were packed.

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On the Naas river the pack of sockeye amounted to 31,277 cases which is the largest since 1916 and is a good average pack of this variety for the locality. These satisfactory figures were rather unexpected after the practical failure the year previous and the gradual decline in the catch during the past few years.

In the Skeena the pack of sockeye was 97,674 cases, as against 40,018 cases in 1921. Like the Naas, the 1922 run is made up largely of four and five year fish and the season was as good as could be expected. At this point the natural conditions in the way of tides, river current, bars, weather, and snags, go a long way towards protecting the runs of salmon and it is not anticipated that there will be any appreciable depletion in the future so long as present conditions do not materially alter.

The pack of sockeye at Rivers inlet is shown as 60,700 but 7,000 cases of these were brought from Smiths inlet which leaves a net pack of 53,700 cases at Rivers inlet. This is somewhat below the average especially in view of the fact that there were 1,012 gill-net licenses issued for the district. However, as in the case of the Skeena river a very satisfactory proportion of the run passed through to the spawning grounds.

The catch at Smiths inlet amounted to 14,227 cases taking into account the 7,000 cases packed at Rivers inlet and 712 cases packed at Shushartie. The result at this point can be regarded as extremely satisfactory and the spawning areas were well seeded.

It will be observed from statement No. 1 that a much larger pack of pinks and chums was put up during 1922 than in the previous year. This is partly accounted for by the fact that it was the big pink year on Queen Charlotte islands where this variety is of such a high quality. In 1921 owing to the market being glutted with these varieties of fish there was practically no sale for them but the following year the old stocks having been disposed of the way was open for a larger pack and these, particularly the chums, have found a ready sale. Unfortunately the market has never been good for canned springs and cahoes and although the runs of these varieties, especially the latter, have been good, there has been no incentive to place them in cans.

Until very recently, owing to the good price obtainable for the sockeye variety, these were looked to by the packers to carry a very large proportion of the expense of canning all varieties but due to a very large extent to the keen competition from the Siberian salmon on the English market there is not now as large a profit from the sockeye pack in British Columbia. In fact there is difficulty in moving those put up during the season 1922 at a price which will realize any profit at all. It is becoming more and more apparent that the industry must count no longer on making considerable profits on the sockeye variety but must look to pinks and chums very largely for their returns in the future. Undoubtedly the principle of packing considerable quantities of the cheaper grades of salmon which can be sold readily at a small margin of profit instead of giving so much attention to the packing of the more expensive variety in which there is at present little profit and which cannot be as easily disposed of, is economically sound.

With the price of sockeye on the Fraser river for instance averaging 80 cents a fish and an average of twelve fish being required to fill a case, it is difficult to see how any profit at all can be made by canners when, added to the initial cost of \$9.60 a case for the raw material, is the actual cost of packing, the insurance, overhead and other expenses necessary before the finished product is placed on the market. In the north the prices paid to the fishermen during the past few years have been between 30 and 45 cents, which are greatly below the prices paid on the Fraser, but on the other hand the cost of packing in the north is greater than in the south owing to the cost of transportation of supplies,

higher wages, and the necessity for taking employees north and returning them at the end of the season. The cost of shipping the finished product to the distributing centre is also an important factor to be taken into consideration.

HALIBUT

The catch of halibut for the year totalled 260,765 cwts., the Canadian boats accounting for 87,445 cwts., and the American boats 173,320 cwts. Owing to the Fordney-McCumber tariff which came into effect in the fall and which provides for a 2 cent a pound duty on fresh or frozen fish coming into the States when caught otherwise than in American bottoms, Canadian fishermen are obliged to accept 2 cents a pound less than their American competitors. The halibut business has been retained, however, at the Canadian ports of Prince Rupert and Vancouver and the business provided for the Canadian railways has been very considerable especially from Prince Rupert from which point the largest quantity of halibut is shipped in bond to the United States over the Canadian National Railway system.

The proposed close season for halibut fishing which has been demanded strenuously by all those interested on both sides of the line bids fair to become a fact at last and should result in infinite benefit to the industry.

The following is a statement of the quantity of halibut landed in British Columbia during the calendar year 1922:—

	Cwts.
Prince Rupert.....	251,605
Vancouver.....	9,160
Total.....	260,765

Halibut landings in British Columbia, 1913 to 1922:—

	Cwts.
1913.....	127,853
1914.....	156,106
1915.....	245,592
1916.....	257,794
1917.....	237,411
1918.....	166,805
1919.....	191,986
1920.....	220,890
1921.....	282,041
1922.....	260,765

HERRING

Apart from the herring used for halibut bait and dry salting there was no very considerable quantity utilized, although a certain amount was kippered. It is regrettable that there is no appreciable market for British Columbia Scotch-cured herring; the chief market, which is in the eastern States, is taken care of to a large extent by the products of the North sea which can be placed in New York at a considerably lower price than can those from British Columbia. Efforts are being made, however to build up a domestic trade in pails and these efforts are worthy of every encouragement.

It is interesting to note that during the past year approximately 40,000 cwts. of Scotch-cured herring were shipped from Alaska through Prince Rupert to markets in the eastern States. Due to the Fordney-McCumber tariff the Alaskan product has an advantage of one cent per pound over that from British Columbia on the American market.

There would appear to be every reason to believe that herring fishing can be prosecuted during the whole year off the coast of this Province and it is

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hoped that conditions will shortly be such as to induce the operators to make the necessary experiments instead of, as in the past, waiting for this variety of fish to come into certain bays and inlets where they can be captured with the minimum of effort.

SUNDRY VARIETIES

The numerous other varieties of edible fish continue to be taken in fairly large quantities although the market is a limited one. Since the government has withdrawn the assistance by way of a rebate of express charges to points as far east as Manitoba the demand has been difficult to maintain.

WHALING

Owing to the recovery of the market for products of the whale, the stations at Naden Harbour, Queen Charlotte islands, and Kyuquot, west coast Vancouver island, which closed down during 1921, were again operated. From each of these two stations two boats engaged in the capture of whales for a period of five months and at Kyuquot additional boats were utilized for one month. As a result of these operations the following numbers of whales were captured:—

Species	Naden Harbour	Kyuquot	Total
Fin.....	57	37	94
Humpback.....	27	23	50
Sperm.....	7	31	38
Sulphur.....	4	.....	4
Sei.....	.....	1	1
Totals.....	95	92	187

FUR SEALS

Fishing for fur seals resulted in 930 being captured off the coast of this Province by the Indians. The price paid for the skins, however, was considerably less than during the previous season although certain of the Indians did very well during the time the herd was passing up the coast.

REDUCTION WORKS PLANTS

Five reduction works plants were operated during the year. For a time following the war conditions the market for products of such plants was most uninviting and it was with difficulty that the operators were able to carry on. However, the prices of oil and fish meals showed considerable strength later in the year and gave the owners of the plants considerable encouragement.

In the waters adjacent to the American boundary in the south, as a result of the protection afforded American fishermen by the Fordney-McCumber tariff, it has been possible for American buyers to come across from Puget sound and outbid the Canadian establishments by as much as \$3 per ton for the raw products in the way of grayfish captured on this side of the line. The Canadian industries are finding this extremely embarrassing and claim that under these conditions it is practically impossible for them to operate.

HAIR SEALS AND SEA LIONS

The immense damage to the fishermens' catch and nets owing to the depredations of hair seals and sea lions is common knowledge. In the Fraser

river, Smiths inlet, Rivers inlet, Skeena river, Naas river, and in fact in all salmon areas, these mammals will totally destroy or mutilate as high as 30 per cent of the number of salmon taken in gill-nets and in fact fishermen have recorded drifts when every salmon taken by the net has been totally or partially destroyed by hair seals before the net could be lifted and the catch secured.

Many suggestions have been made with a view to eliminating these mammals but to date no satisfactory method has been devised. In the winter of 1921-22 owing to strong representations made by the fishermen, cross lines were permitted to be operated in the Fraser river for the purpose of taking hair seals but between December 1 and May 31, although equipment was operated by 23 fishermen, only 13 hair seals were captured which proves conclusively that this method is not a satisfactory one.

In the early part of July the C.G.S. *Givenchy* was dispatched to the Pearl rocks, opposite Rivers and Smiths inlets for the purpose of demonstrating the efficacy of machine gun and rifle fire on the sea lions which gather in large numbers on the rookeries in the early summer months. It is estimated that with approximately 600 rounds of ammunition 220 sea lions were accounted for. Owing to the fact that the pups were fairly well grown the success of the operation was not as great as anticipated but it is the intention to next year proceed to the same point a month earlier when the pups are very young and when it will be a simple matter to destroy them by means of clubs, reserving the machine gun and rifle fire for the parents.

PATROL SERVICE

On the 1st of July, owing to the Fisheries Protection service being absorbed by the Fisheries Patrol Service, the steamers *Malaspina* and *Thiepval* became available and were utilized to a considerable extent assisting in the supervision of the salmon and other fisheries instead of being confined solely to the halibut fisheries and the three mile limit. With the addition of these two boats the patrol fleet consisted of three steam trawlers, one other steamboat and 21 gasoline boats belonging to the department. In addition 50 gasoline boats and 7 row boats were chartered from various parties, for periods ranging from one to six months, during the fishing season, making a total of 82 boats.

Experience has shown that instead of the small launches or boats built merely for speed and appearance on inside waters, something more after the style of a seine boat is necessary in such waters as Rivers inlet and for the purpose of taking the several inspectors over their districts. In this connection it is very gratifying to note that there is a prospect of the impractical and extremely expensive "Fispa" being disposed of and a boat more efficient and less costly of operation being provided in her stead. Undoubtedly as new boats are required of sufficient size as will permit, the gasoline and distillate engines should be discarded for those of the full Diesel or semi-Diesel variety. The saving in the cost of operation is enormous and their efficiency is as great, if not more so, than that of gasoline engines.

REGULATIONS

In January, following the non-success of the attempt to get together with the Washington State Fisheries Board with a view to the conservation of the Fraser river salmon runs, a separate attempt was made to obtain the co-operation of the State Board for the purpose of providing a weekly closed season of sixty hours for sockeye fishing on the Fraser river and Puget sound. The state

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board, however, felt that as it had advised the Washington State industry that no further measures would be taken during the year it would not be possible to enter into the suggested arrangement.

With a view to encouraging white and Canadian Indian subjects to enter the fishing industry in the province a reduction of $33\frac{1}{3}$ per cent was made this year in the number of salmon trolling licenses issued to other than resident white British subjects and Canadian Indians. As a result considerable difficulty was at first experienced in effectually enforcing such reduction and it became necessary to amend the regulations in such a manner as to provide for definite control of fishermen and boats leaving the shores of Canada to operate in extra-territorial waters.

The records of the catch of sockeye in district No. 2 up to 1921 showed conclusively that some additional measures were required in order that conservation might be properly provided for and six hours were consequently added to the weekly closed period in all sections of the district. Judging from the reports on the several spawning areas, the results well justified this curtailment of fishing operations.

Special attention was given to the protection of the salmon waiting at the mouths of streams for high water which would enable them to ascend to the spawning grounds. Owing to the great distances and areas to patrol this is a very difficult matter but it is believed that the regulations in this respect were reasonably well enforced. The reports received on the spawning areas would appear to confirm this conclusion. It will be appreciated that with a large percentage of the fishery guardians being seasonal employees only it is difficult to procure the services of experienced and competent men.

In certain portions of the northern district it was found that sufficiently good results were not being obtained from the patrol service and it is the intention to, when the time arrives for re-employment for the season 1923, arrange for a partial reorganization.

It is interesting to observe that during the year there were 173 prosecutions for violations of the fishery regulations.

ANGLING

Each year more and more attention has to be given to angling in the province. As the country becomes more settled and is better known as a fisherman's paradise new demands are made on the department's officers for closer supervision of the sporting streams. Owing to the great extent of fishing area it is a very difficult matter even in the vicinity of the thickly populated districts for the several officers to keep as closely in touch with angling conditions as could be desired. It is hoped, however, that with the assistance of the numerous angling associations which are coming into existence all through the province, the fishermen can be educated from a standpoint of regulations and fish culture to such an extent as to reduce to a minimum the difficulties of the fishery officers.

In addition to the splendid supply of such excellent sporting fish as the steelhead, cutthroat and rainbow trout, and the spring salmon, native to British Columbia, the department has successfully introduced the Atlantic salmon and Eastern Brook trout into the province and is each season by means of fish cultural methods restocking depleted streams and lakes as well as providing supplies of sporting and food fish in waters where none has existed in the past.

SCIENTIFIC INVESTIGATION

It has been contended that a large proportion of the catch of spring salmon off the west coast of Vancouver island by means of trolling is composed of immature fish and that much damage is being done to the supply by the inten-

sive operations being conducted. In order that the department might have full information on this point an officer was stationed on the west coast of the island during the trolling operations. He kept in close touch with the fishing camps and obtained abundant data in the way of measurements, scales, and other information which has been turned over to the Biological Board for examination and report. If it is found that an undue proportion of the catch is composed of immature fish the necessary action looking to conservation will be taken.

In order to determine the advisability or otherwise of steps being taken to eliminate trout and other predaceous fish from streams and lakes frequented by salmon, two officers of the Biological Board were stationed at Harrison lake from June 7 to September 8 for the purpose of conducting investigations and collecting data. As this and related work is of considerable magnitude more than one season will be required for the purpose of obtaining intelligent information on which safe conclusions can be based.

CLEARING OBSTRUCTIONS IN SALMON STREAMS

During the year the Engineering Branch was kept very busy in the work of clearing obstructions to the ascent of salmon in the numerous streams of the province. The principal streams receiving attention were as follows, together with the expenditure in connection with each:—

	\$	cts.
Wakwash river, Owekano lake.....	1,750	00
Markwell river, Owekano lake.....	1,550	00
Schumahawk river, Owekano lake.....	800	00
Yakoun river, Q.C.I.....	4,476	25
Ian river, Q.C.I.....	248	60
Silver creek, vicinity Hope.....	2,419	55
Salmon river, Kamloops.....	1,700	17
Fishermen's river, V.I.....	1,056	01
San Josef river, V.I.....	1,135	15
Bella Bella District:		
McLaughlin creek	}	1,365 23
Tinkey creek		
Kisimete creek		
Howyet creek		
Big Qualicum river.....	185	75
French creek.....	416	08
Kakweiken river, head of Thompson Sound.....	294	18
Embley Lagoon.....	168	69
Oyster river.....	113	92
Skutz Falls.....	260	00

Considerable work was also done at the Pemberton hatchery in the way of renewing fences and cribs which had been washed out owing to unusually heavy freshets in the Birkenhead river. The cost of this work was \$3,346.82.

Abundant evidence is available throughout the province to show the desirability of continuing the clearing of obstructions in such streams and many which for several years have been blocked entirely are now being used again extensively by spawning salmon.

During the year 1921, having in view the strictest economy possible, attention was given to sockeye streams only but it has been found absolutely necessary to give more attention to the other varieties of salmon for which the demand is increasing year by year. For this reason the work of clearing obstructions was extended to such points as Queen Charlotte Islands where it is particularly desirable owing to 1922 being the year of the big run of pinks.

Hells gate, Fraser river.—Opinions have been expressed recently to the effect that the work done by the department in the way of clearing obstructions to the ascent of salmon at Hells gate on the Fraser river was not efficiently performed and that as a result the salmon are not able to pass this point and ascend to the spawning grounds. Those most capable of judging the conditions are the

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department's own officer with headquarters at Hope and the assistant to the Commissioner of Fisheries at Victoria. These gentlemen have given Hells gate a very great deal of attention since the slide and as a result of their observations state most emphatically that the clearing work was well done and that the bed of the river was certainly restored to the condition obtaining prior to the slide and when the passage was made by such immense quantities of parent salmon. At certain stages of the water even before the slide salmon have always had difficulty in passing this point but it is only a matter of waiting perhaps a few hours or possibly a day or two before the water conditions are suitable and all salmon are able to ascend.

REVENUE

It has been suggested from time to time that the fees required of the fishing industry in British Columbia are not justified and in connection with the salmon fishing are largely the result of unusually profitable conditions during the war when prices were high and considerable profit was being made. Under present conditions, however, there is no doubt that most of the license fees charged are far too heavy and considerable relief to the industry would result if fees were more of a nominal nature. In view of the huge benefits which result to the country generally from the operations of those engaged in the industry by way of the employment of thousands of individuals, the distributing of millions of dollars each season to fishermen and merchants, and in numerous government taxes, there would seem to be little justification for the continued large license fees.

MEETINGS WITH INSPECTORS AND OVERSEERS

The usual annual spring meeting with the inspectors of the three districts, together with their overseers, was held in Vancouver and the results obtained were most satisfactory. Each season the benefit of such meetings becomes more apparent and the efficiency of the service is increased.

BRITISH COLUMBIA FISHERIES COMMISSION

The Fisheries Commission, composed of six members of the Federal House Committee on Marine and Fisheries, spent several weeks on the coast during the late summer investigating the fisheries of the province and on its return to Ottawa submitted to the department an interim report containing certain recommendations which it was considered necessary to make pending the submission of the final report, which it is expected will contain many recommendations which will result in permanent benefit to the fishing industry.

CONFERENCE WITH ALASKA AUTHORITIES

A considerable portion of the run of salmon heading for the Naas river passes through Alaskan waters and is intercepted by the American traps and other fishing gear. Between the equipment used on the Alaskan side and that used on the Canadian side the result has been over fishing to such an extent that the run of salmon to the Naas river has become to a large extent depleted. The conditions in this respect are very similar to those obtaining on the Fraser river where practically all the run of sockeye salmon in particular passes through American waters before reaching the Fraser.

In March a meeting was arranged with the Secretary of the Alaska Fisheries Commission in Vancouver for the purpose of discussing Naas river conditions with a view to joint regulations looking to the conservation of the runs to the Naas. On the secretary's arrival at Vancouver, however, he was

advised by his department in Washington, D.C., to the effect that according to the then existing law it would not be possible to enter into the necessary arrangement with the Canadian authorities. It is hoped, however, that in the near future further efforts will result in better success.

INSPECTION OF SPAWNING AREAS

The usual examination of the salmon spawning beds was made by the fishery officers where practicable and the resultant reports received show that with few exceptions the several areas were plentifully supplied naturally with spawn.

In the Naas river district the supply of sockeye reaching the Meziaden lake showed a great improvement over the last few years, the run of sockeye at least equalling that of the year 1917. An inspection of the Bowser lake district was also made after many difficulties but from the information obtained it would appear that the lake is not particularly valuable from a standpoint of spawning sockeye.

In the Skeena river watershed conditions were found to be eminently satisfactory, the Babine lake and Lakelse lake spawning areas being abundantly seeded with sockeye ova. This also applies to the Kitsumkelum area.

In the Bella Coola and Kimsquit areas the reports show that the spawning grounds received an abundant supply of sockeye eggs. Considerable money has been spent in recent years in this vicinity in the way of clearing obstructions from streams and the result has certainly justified the expense.

In the Rivers inlet district it was found that a satisfactory quantity of spawning sockeye did not reach the streams at the head of Owekano lake but that the remainder of the spawning areas were splendidly seeded. Attention is being given, however, to the first-mentioned streams by means of fish cultural methods and an adequate supply of sockeye salmon eggs and fry is being planted at these points.

Reports from the Smiths inlet district show that satisfactory quantities of sockeye salmon ascended to the spawning areas in that vicinity. The quantities of spring salmon observed in this district is also worthy of note.

On the west coast of Vancouver island the number of parent sockeye salmon reaching the spawning areas at Kennedy lake was very satisfactory and the hatchery situated on the lake was filled to capacity with eggs of the sockeye variety. There was also a good run of sockeye to the Anderson lake and that hatchery was also filled to capacity.

A fairly good run also ascended the Sproat and Stamp rivers.

The reports received from the Fraser river watershed show that compared with recent years a very fair supply of parent sockeye salmon reached the spawning grounds together with an unusually large quantity of spring salmon which ascended in considerable numbers to the head waters of the Fraser and were observed in quantities particularly in the Nechako system and as far up as Tete juan Cache. A few hundred parent sockeye salmon were observed in the Nechako river system.

The Bowron lake and river system showed no improvement over last year when only a few sockeye were observed.

In the Quesnel district the conditions apparently were very similar to those of last year when a certain number of spawning sockeye were observed but the quantity is infinitesimal when compared with runs of previous years when millions were counted.

In the Chilco and Chilcotin districts the reports received would indicate that only a very few sockeye salmon were seen.

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The reports from the Stuart lake district show conditions this year to be very similar to last season. The Indians obtained in the vicinity of 1,500 parent sockeye but owing to there being a considerable amount of work available the fishing operations by the Indians did not assume the same proportions as in previous seasons and it is reasonable to assume that a fair supply compared to the last few years reached the spawning grounds. Undoubtedly the run of spring salmon to the Nechako and Stuart lake systems was the best for a number of years. It has been suggested that this is possibly due to there being considerably less fishing equipment operating in Puget sound during the time spring salmon were passing through on their way to the Fraser.

In the North Thompson river the run of sockeye is reported as being slightly in excess of the last few years. In the South Thompson a good run of sockeye passed up the river and which was reported to have exceeded the run of the previous eight years.

The Shuswap district particularly in the vicinity of Adams river received a greater quantity of sockeye spawn than for the last three seasons.

In the Bridge river district there was again a very splendid run of sockeye. The hatchery was filled to capacity and large quantities of parent fish were permitted to spawn naturally.

In the Harrison lake district the supply of spawning sockeye at Morris creek was considerably in excess of the previous few seasons and the whole run to the Harrison district shows a decided improvement.

The Cultus lake and Chilliwack lake system was plentifully supplied with sockeye, coho, and steelhead eggs.

The run of sockeye to the Pitt lake district was estimated to be at least 25 per cent greater than the runs of recent years. A plentiful supply of spring and coho salmon was also observed.

The spawning areas in the vicinity of Burrard inlet and Howe sound were well supplied with chum salmon but this year is the off one for the pink variety.

DEPARTMENT OFFICIALS

It is with much pleasure that I refer to the visit of the Superintendent of Fish Culture together with the Fisheries Engineer for the purpose of a thorough inspection of the hatchery service in the province. It is only by such visits made frequently that the proper touch can be maintained and mutual difficulties appreciated.

STAFF

All members of the staff have had an exceedingly busy year and frequently it is found necessary to remain after hours and for several members of the staff to spend many evenings and Saturday afternoons in the office in order that the work may be kept up. Temporary assistance, which can be obtained from time to time, is mostly unsatisfactory as a considerable portion of the period of employment is consumed in learning the work and as such positions are only temporary there is not the same interest shown as would be the case with a permanent member of the staff.

OBITUARY

It is with very great regret that I refer to the deaths of Mr. Robert Gold, a member of the staff of the Inspector of District No. 3, at Nanaimo, Mr. D. F. M. Perkins, Fishery Overseer for the Fort George District, Mr. Ernest Parker, deckhand on the F. P. L. *Merrysea*, who was drowned on July 6, 1922, and Mr. John Widsten, Fishery Overseer at Bella Coola, who was killed by a falling tree on December 12, 1922.

STATEMENT OF SALMON PACK—BRITISH COLUMBIA

WHOLE PROVINCE—1895 TO 1922

STATEMENT No. 1

Year	Number of canneries operated	Sockeye	Red Spring	Pink Spring	White Spring	Bluebacks	Steelheads	Chohoes	Pinks	Chums	Totals
1895.	36	Particulars of varieties not available									566,395
1896.	47	"	"	"							601,570
1897.	54	"	"	"							1,015,477
1898.	51	"	"	"							484,161
1899.	59	"	"	"							732,437
1900.	64	"	"	"							585,413
1901.	73	"	"	"							1,236,156
1902.	66	531,436	Springs and Fall: 94,546								625,982
1903.	59	Particulars of varieties not available									473,674
1904.	51	323,226	(35,421 Red & Wh.								465,894
1905.	67	1,080,673	(28,359 Red & Wh.		Springs) Fall: 107,247						1,167,460
1906.	64	459,679	31,261		1,083			44,458	13,970	Pinks and Chums	629,460
1907.	58	314,074	23,159		2,939		683	87,900	(118,704	"	547,459
1908.	52	355,023	25,433		2,751		1,137	81,917	(76,448	"	542,689
1909.	72	840,441	18,218		799			61,918	(46,544	"	967,920
1910.	58	565,915	19,313		9,476		140	74,382	34,613	58,362	762,201
1911.	59	383,509	38,751		9,705			119,802	305,247	91,951	948,965
1912.	57	444,762	62,345		18,092			165,309	247,743	58,325	996,576
1913.	78	972,178	37,433		3,616			69,822	192,887	77,965	1,353,901
1914.	63	556,696	32,008		16,420			120,201	220,340	184,474	1,111,039
1915.	63	476,042	51,734		6,370			146,956	367,352	82,000	1,133,381
1916.	72	214,789	51,231		15,495			183,623	280,644	240,201	1,995,065
1917.	339,848	48,630			27,646			157,589	496,759	475,273	1,537,485
1918.	276,459	65,535		(41,819			B.B. & S.H.)	191,068	527,745	472,615	1,616,157
1919.	369,445	73,179		9,077			B.B. & S.H.)	175,670	346,639	372,035	1,393,156
1920.	82	351,405	95,983	8,441	18,295	24,323	2,395	101,972	520,856	84,626	1,187,616
1921.	65	163,914	36,725	6,061	13,877	8,061	1,220	117,258	192,906	71,408	1,603,548
1922.	64	299,614	21,163	11,913	6,520	7,060	1,657	102,845	581,979	258,204	1,290,326

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PACK OF CANNED SALMON ON THE FRASER RIVER, 1895 TO 1922

STATEMENT No. 2

Year	Number of canneries operated	Number of gill-nets operated	Sockeye	Red Spring	Pink Spring	White Spring	Bluebacks	Steelheads	Cohoos	Pinks	Chums	Totals
1895.....	21		400,368									400,368
1896.....	29		356,984									356,984
1897.....	32		860,459									860,459
1898.....	35		256,101									256,101
1899.....	41		510,383									510,383
1900.....	48		316,522									316,522
1901.....	49	3,832	990,313									990,313
1902.....	42	2,685	293,477	Other varieties:								327,095
1903.....	35	3,101	204,809	(2,084	Red. & Wh. Spring)	33,618			25,728	4,504		237,125
1904.....	23	2,224	72,688	(9,482	Red. & Wh. Spring)				45,667	1,066		128,903
1905.....	38	2,770	837,489	(5,507	Red. & Wh. Spring)				30,836	3,304		877,136
1906.....	24	1,746	183,007	6,503		1,020			34,413	(15,543	Pk. and Chums)	240,486
1907.....	18	1,726	59,815	3,448		557			35,766	(63,530	"	163,116
1908.....	16	1,374	63,126	1,427		18			24,198	(415	"	89,184
1909.....	38	2,688	542,248	1,428					21,540	(1,987	"	567,203
1910.....	21	1,577	133,045	1,018		8,925			27,855	128	52,177	223,148
1911.....	15	1,396	58,487	7,028		6,751			39,740	142,101	47,237	301,344
1912.....	15	1,430	108,784	14,655		8,373			38,574	574	12,961	173,921
1913.....	35	2,560	684,596	3,573		49			11,648	9,973	22,220	732,059
1914.....	20	2,656	185,483	9,485		14,000			38,639	6,057	74,726	328,390
1915.....	22	2,616	89,040	15,388		3,532			34,114	128,555	18,539	286,119
1916.....	21	2,240	27,394	11,096		9,217	3,096	31	24,580	30,184	30,184	106,440
1917.....	29	2,626	123,614	10,197		18,916	4,944	33	25,895	134,442	59,973	377,988
1918.....	18	1,582	16,849	15,192		24,274	3,760	7	40,111	18,388	86,215	206,003
1919.....	14	1,337	29,628	14,519	579	3,592	15,613	635	39,253	39,363	15,718	158,718
1920.....	11	1,288	44,598	19,961	704	2,204	4,488	328	22,934	12,839	23,884	132,860
1921.....	13	1,437	35,900	11,360	2,467	5,480	1,323	8	28,978	8,178	11,223	103,917
1922.....	10	1,296	48,744	10,561	2,433	3,867	812	5	23,587	29,578	17,855	137,482

PACK OF CANNED SALMON ON PUGET SOUND FROM 1887 BY SPECIES

STATEMENT No. 3

Year	Number of canneries operated	Spring	Sockeye	Medium Red	Chum	Pink	Steelhead	Total
1887	4							22,000
1888	2	240		7,480	1,145			21,975
1889	1	1,000		3,000	4,000	2,890		11,674
1890	2	382		5,869	3,093			8,000
1891	2	86	5,538	7,206	16,180	5,647		20,529
1892	2	1,200	2,934	11,812	11,380	17,530		26,436
1893	3		47,852	22,418	22,152	9,049		89,351
1894	3		65,143	50,865	38,785	23,633		95,400
1895	7	1,542	72,979	82,640	26,550			179,908
1896	11	13,495	312,048	91,900	23,310	57,268		195,604
1897	12	9,500	252,000	98,600	38,400			494,026
1898	18	11,200	252,000	111,387	31,481	252,733		400,200
1899	19	24,364	499,646	128,200	89,100			919,611
1900	19	22,350	229,800					469,450
1901								1,380,590
1902	21	30,049	372,301	85,817	93,492			581,659
1903	22	14,500	167,211	103,450	12,001	181,236		478,488
1904	13	14,441	109,264	118,127	49,656			291,438
1905	24	1,804	825,453	79,335	41,057	70,992		1,018,641
1906	16	8,139	178,748	94,497	149,218			430,602
1907	14	1,814	93,122	119,472	50,249	433,423		698,080
1908	22	95,210	170,951	128,922	47,607	6,075		448,765
1909	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910	24	10,084	248,014	162,755	146,942			1,567,883
1911	15	21,823	127,761	256,124	104,321	1,046,992		1,557,029
1912	20	20,252	184,680	149,727	60,760			416,125
1913	22	1,234	1,673,099	61,019	56,225	791,886		2,583,463
1914	31	26,044	335,230	151,893	278,801	892		792,860
1915	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916	32	37,030	84,637	155,832	427,878	1,887		707,278
1917	43	57,543	411,538	114,276	216,285	1,124,884		1,921,554
1918	32	63,366	50,723	235,860	267,538	6,605	106	624,198
1919	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,620
1920	11	25,846	62,654	24,502	48,849	4,669		166,526
1921	23	25,567	102,967	89,412	30,831	404,713		653,490
1922	16	20,615	48,566	111,771	65,552	2,225		248,729

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PACK OF CANNED SALMON ON NAAS RIVER, 1895 TO 1922

STATEMENT No. 4

Year	Number of canneries operated	Number of gill-nets operated	Sockeye	Red Spring	White Spring	Bluebacks	Steelheads	Cohoos	Pinks	Chums	Totals
1895.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,550
1896.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,649
1897.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,847
1898.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,953
1899.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,443
1900.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,238
1901.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,790
1902.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,318
1903.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,100
1904.....	2	.....	.....	.....	.....	.....	.....	.....	31	.....	19,085
1905.....	3	.....	.....	.....	.....	.....	.....	.....	1,840	.....	32,725
1906.....	3	.....	.....	.....	.....	.....	.....	.....	3,450	(Pinks and Chums)	32,534
1907.....	3	.....	.....	.....	.....	.....	.....	.....	5,957	.....	31,832
1908.....	3	.....	.....	.....	.....	.....	.....	.....	6,612	.....	46,908
1909.....	3	.....	.....	.....	.....	.....	.....	.....	3,589	.....	40,990
1910.....	4	.....	.....	.....	.....	.....	.....	.....	895	.....	39,720
1911.....	3	.....	.....	.....	.....	.....	.....	.....	11,467	.....	65,684
1912.....	3	.....	.....	.....	.....	.....	.....	.....	12,468	.....	71,162
1913.....	3	.....	.....	.....	.....	.....	.....	.....	3,172	.....	53,423
1914.....	4	.....	.....	.....	.....	.....	.....	.....	20,539	.....	94,890
1915.....	4	.....	.....	.....	.....	.....	.....	.....	25,333	.....	104,289
1916.....	4	.....	.....	.....	.....	.....	.....	.....	34,879	.....	111,076
1917.....	4	.....	.....	.....	.....	.....	.....	.....	59,593	.....	126,686
1918.....	6	.....	.....	.....	.....	.....	.....	.....	44,568	.....	119,495
1919.....	5	.....	.....	.....	.....	.....	.....	.....	59,206	.....	143,908
1920.....	5	.....	.....	.....	.....	.....	.....	.....	29,949	.....	97,512
1921.....	5	.....	.....	.....	.....	.....	.....	.....	43,151	.....	81,153
1922.....	5	.....	.....	.....	.....	.....	.....	.....	29,488	.....	51,765
						42	193	3,533	75,687	11,277	124,071

PACK OF CANNED SALMON, SKEENA RIVER, 1895 TO 1922

STATEMENT No. 5.

Year	No. of Cys.	No. of G.N.	Sockeye	Red Spring	Pink Spring	White Spring	Steel- head	Coho	Pink	Chums	Total
1895	7			Parti- culars of var	ities not av	ailable					67,797
1896	8		"	"	"	"					100,140
1897	8		"	"	"	"					65,905
1898	6		"	"	"	"					81,234
1899	7		"	"	"	"					108,026
1900	10		"	"	"	"					128,529
1901	11		"	"	"	"					126,092
1902	10		"	"	"	"					154,875
1903	10		"	"	"	"					98,669
1904	11		93,404	(20,621	Red & White Spr.)			10,315	30,529		154,869
1905	12		84,717	(14,598	"			7,247	7,523		114,085
1906	14		86,394	20,138				16,897	(38,991	Pinks and (Chums)	162,420
1907	13		108,413	10,378				15,247	(25,217	"	159,255
1908	13		139,846	13,374				10,075	(45,404	"	209,177
1909	12		87,901	11,727		468		12,249	(28,120	"	140,739
1910	12		187,246	9,546		742		11,531	13,473		222,035
1911	12	850	131,066	15,514		239		23,376	81,956		254,410
1912	12	850	92,498	19,332		2,428		39,835	97,588	70	254,258
1913	13	850	52,927	23,250		4,501		18,647	66,045	504	164,055
1914	13	850	130,166	11,529		3,186		16,378	71,021		237,634
1915	13	962	116,553	15,069		211		32,190	107,578	8,329	279,161
1916	14	868	60,523	18,372		2,561	1,798	47,409	73,029	5,769	293,158
1917	15	788x	65,760	13,586		2,699	3,743	38,456	148,319	17,121	292,219
1918	15	788x	123,322	16,013		6,828	1,883	38,759	161,727	21,516	374,216
1919	14	1,153	184,945	19,661		2,656	2,672	36,559	117,303	22,573	398,877
1920	15	954	90,869	37,403		3,123	1,218	18,068	177,679	31,457	334,392
1921	13	1,109	40,018	18,599		2,198	498	45,033	124,457	1,993	234,765
1922	15	1,091	97,674	7,576		2,722	1,050	14,067	195,580	17,343	335,944

x Approx.

NOTE: Figures of pack for 1922 approximately.

STATEMENT OF SALMON PACK AT SMITHS INLET, DISTRICT No. 2, FROM 1912 TO 1922

STATEMENT No. 7

Year	No. of canneries operated	No. of Gill-nets operated	Sockeye	Red Spring	White Spring	Blue- backs	Steel heads	Cohoe	Pinks	Chums	Totals
1912.....	1	.....	16,333	(771 Red	and White)	.....	.....	85	2,914	998	21,101
1913.....	1	.....	17,600	995	.....	.....	.....	48	2,190	2,015	22,848
1914.....	No records	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1915.....	1	available	32,301	Other var- ieties	.....	292	.....	.....	.....	.....	32,593
1916.....	1	.....	13,256	Other var- ieties	.....	13,990	.....	.....	.....	.....	27,246
1917.....	2	.....	14,131	Other var- ieties	.....	4,325	.....	.....	.....	.....	18,456
1918.....	2	115	13,441	Other var- ieties	.....	10,736	.....	.....	.....	.....	24,177
1919.....	2	115	15,814	Other var- ieties	.....	13,053	.....	.....	.....	.....	28,867
1920.....	1	147	11,991	(15 Red & Wh.)	.....	.....	.....	14	542	.....	12,562
1921.....	1	173	3,429	42	44	.....	.....	66	31	.....	3,612
1922.....	1	179	6,515	.....	.....	.....	.....	25	19	.....	6,559

APPENDIX No. 2

FINANCIAL STATEMENT, FISHERIES, 1922-23

Vote No.	Service	Appropriation		Expenditure	
		\$	cts.	\$	cts.
252	Salaries and disbursements of fishery officers, Fisheries Patrol Service.....	683,000	00	612,861	57
253	Building fishways, etc.....	40,000	00	16,115	99
254	Legal and incidental expenses.....	4,000	00	1,475	97
255	Conservation and development of deep-sea fisheries.....	25,000	00	21,761	65
256	Fisheries Intelligence Bureau.....	2,000	00	1,235	73
257	Inspection of canned and pickled fish.....	21,000	00	20,997	05
258	Fish culture.....	370,000	00	332,329	93
259	Scientific investigations into fisheries.....	15,000	00	3,649	94
260	Marine Biological Board.....	42,000	00	42,000	00
536	Compensations <i>re</i> C.G.S. <i>Givenchy</i>	1,198	80	1,192	80
537	International fishing schooner race.....	5,000	00	5,000	00
216	Fisheries Protection Service.....	345,500	00	196,639	25
		1,553,698	80	1,255,259	93
	Civil Government salaries.....	96,100	00	87,296	48
	Contingencies.....	25,000	00	23,579	51
	Fishing bounty.....	160,000	00	157,172	55
		1,834,798	80	1,523,308	47
	Gratuities.....			640	00
	Superannuation No. 4, Retirement Act, 1920.....			1,050	00
563	Cost of Living Bonus.....			58,327	38
577	Reclassification arrears.....			267	05
	Total net expenditure, 1922-23.....			1,583,592	90

REVENUE COLLECTED, 1922-23

Class	Licenses	Revenue tax	Fines	Sales	Total collected	Amounts refunded	Net revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Licenses, etc.—							
Nova Scotia.....	11,134 56		1,228 00	361 46	12,724 02	12 00	12,712 02
Prince Edward Island.....	4,318 75		1,255 00	237 13	5,810 88	1 00	5,809 88
New Brunswick.....	15,893 32		1,934 50	1,351 99	19,179 81		19,179 81
Ontario.....			5 00	2,014 60	2,019 60		2,019 60
Manitoba.....	11,628 50		176 50	305 49	12,110 49	37 50	12,072 99
Alberta.....	11,817 25		100 00	35 55	11,952 80	5 00	11,947 80
Saskatchewan.....	2,418 00		284 50	202 15	2,904 65		2,904 65
British Columbia.....	149,654 83	63,355 97	7,221 00	3,916 27	224,148 07	491 50	223,656 57
Yukon.....	320 00				320 00		320 00
Totals.....	207,185 21	63,355 97	12,204 50	8,424 64	291,170 32	547 00	290,623 32
Casual.....							5,183 15
Fish culture.....							2,972 98
Modus vivendi licenses.....							3,697 50
Fines and forfeitures.....							1 00
Revenue under Pelagic Sealing Treaty.....							59,876 83
Premiums on exchange.....							467 12
Total net revenue collected, 1922-23.....							362,821 90

DETAILED STATEMENT OF SALARIES AND DISBURSEMENTS EXPENDITURE, 1922-23

Provinces	Inspector's Overseers and Ward's		Allowances			Gasoline and Oil	Special Guardians		Sundry	Total
	Salaries	Disbs.	Auto	Boat	Horse		Wages	Expenses		
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	cts.
<i>Eastern Division—</i>										
General account.....	12,585 00	1,995 13							217 82	14,797 95
Nova Scotia No. 1.....	11,845 00	3,167 80	3,034 39	581 25	74 20	224 05	13,522 37	83 48	243 21	32,775 75
" No. 2.....	15,300 00	2,863 91	3,566 67	218 75	625 00	169 08	4,794 63	430 63	205 29	28,173 96
" No. 3.....	17,266 93	4,876 90	3,600 00		900 00		3,342 51	30 00	189 49	30,205 83
New Brunswick No. 1.....	8,655 00	1,949 65	1,543 00	300 00	267 74	229 29	2,047 00	10 00	105 70	15,707 38
" No. 2.....	15,644 14	3,406 51	3,817 19	615 35	346 43	456 61	9,067 27	3 50	929 11	34,282 61
" No. 3.....	6,308 00	1,318 76	333 33	75 00	350 00	89 23	6,301 52		25 97	14,805 31
Prince Ed. Isl. No. 1.....	7,104 11	1,875 54	1,451 61	37 50			1,251 00	186 15	734 36	12,640 27
" No. 2.....	2,130 00	888 68		150 00					11 95	3,527 48
	96,838 18	22,342 88	17,346 19	1,977 85	2,563 37	1,515 11	40,926 30	743 76	2,662 90	186,916 54
Quebec.....									134 39	134 39
<i>Central Division—</i>										
General account.....	4,740 00	187 82							31 05	4,938 87
Manitoba.....	6,878 65	3,680 59			594 74		202 50	123 00	184 86	11,822 00
Saskatchewan.....	8,865 00	3,306 79	112 50	112 50	750 00		252 50	470 30	62 51	13,932 10
Alberta.....	8,546 99	3,527 52	75 00	106 25	350 00		435 00	557 55	92 15	13,690 46
	29,030 64	10,702 72	187 50	376 41	1,694 74		890 00	1,150 85	370 57	44,403 43
<i>British Columbia Division—</i>										
General account.....	18,698 89	1,762 53							4,093 71	24,555 13
British Columbia No. 1.....	9,934 13	8,007 50					5,635 97	1,572 87	814 19	25,964 66
" No. 2.....	11,035 32	3,934 05					4,044 83	378 35	1,452 77	20,845 32
" No. 3.....	14,118 52	6,534 69					5,175 83	1,108 14	770 47	27,855 94
	53,786 86	20,238 77					14,856 63	3,059 36	7,131 14	99,221 05
General Account.....									15,523 04	15,523 04

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SUMMARY

Eastern Division.....	96,838 18	22,342 88	17,346 19	1,977 85	2,563 37	1,515 11	40,926 30	743 76	2,662 90	186,916 54
Quebec.....	29,030 64	10,702 72	187 50	376 41	1,694 74	.....	890 00	1,150 85	134 39	134 39
Central Division.....	53,786 86	20,238 77	.....	.....	.....	148 29	14,856 63	3,059 86	370 57	44,403 43
British Columbia Division.....	.....	.....	.....	.....	.....	.....	.....	.....	7,131 14	99,221 05
General Account.....	.....	.....	.....	.....	.....	.....	.....	.....	15,523 04	15,523 04
Totals.....	179,655 68	53,284 37	17,533 69	2,354 26	4,258 11	1,663 40	56,672 93	4,953 97	25,822 04	346,198 45

"Blue Bird"	267 74	56 55	7 15	0 40	83 00	414 84
"Boy Bob"	186 67	75 74	5 20	0 95	61 00	329 56
"Choreboy"	355 88	117 22	27 55		271 00	771 65
"Corycia"	239 57	72 00	14 40	1 60	75 00	402 57
"Dixie"	1,323 55	197 16	46 85	3 13	739 20	2,300 89
"Dustie"	1,400 00	156 33	11 74	4 83	610 00	1,242 90
"Ethelda"			21 15			21 15
"Evanson"	564 00				39 34	603 34
"Flossie"	80 65	25 85	1 00		25 00	132 50
"Frisbie"	460 00	163 60	11 07	4 83	610 00	1,249 50
"Gene"	900 00	511 54	84 80	6 77	1,464 00	2,967 11
"Grace R."	600 00	126 40	11 00		187 00	924 40
"Hyak"	150 00	32 48	10 71		47 00	240 19
"Inanda"	250 00	11 40			76 00	339 70
"Iona"	905 00	161 55	38 51	6 91	918 00	2,029 97
"Law"	258 06	51 10	9 55		79 00	397 71
"Mable"	82 81	460 00	17 11		610 00	1,189 92
"Marie S."	1,125 00	230 80	55 09	13 83	1,015 00	2,439 72
"Murrelette"	1,088 44	766 39	87 09	3 16	1,776 00	3,721 08
"Mystery"	446 67	170 33	15 00		137 00	769 00
"McKenzie"	274 19	67 40	14 45	1 40	84 00	441 44
"Nell"	500 00	48 10	4 50	2 40	155 00	710 00
"Nicolson"	961 29	213 17	11 41		322 80	1,358 20
"Noohalk"	900 00	252 96	45 38	11 18	854 00	2,023 73
"Odessa"	941 49	79 88	13 10	9 00	1,052 65	2,269 20
"Olive"	566 67	20 33	5 75	3 16	173 00	835 81
"Owl"	406 33	280 71	24 28	8 06	432 00	867 57
"Oyashimo"	1,075 32	232 41	27 41		1,429 40	2,817 77
"M"	1,252 58	754 41	27 40		782 34	2,294 77
"Pachena"	1,332 88	46 54	9 60	3 21	2,545 65	4,914 55
"Pioneer"	1,427 42				131 00	614 56
"Red Wing"					20 00	20 00
"Regal R."		321 73	42 47	8 03	340 00	712 28
"Reliance"	241 93	53 83	8 82		197 95	502 53
"Result"	887 09	256 46	31 73	3 12	266 18	1,444 58
"Salmo"		3 20				3 27
"Seal Cove"	782 42	4 20			1,485 00	2,271 62
"Shushartie"	206 45	33 44	4 85		71 10	315 84
"644"	210 00	58 85	10 60		58 00	337 45
"Sopham"	867 00	232 78	80 64	11 69	1,220 00	2,412 11
"Sophia"	285 16	33 78	7 50		95 92	422 36
"Spruce"	100 16	31 38	3 46	1 84	162 00	298 84
"Stubbs"	300 00	101 87	19 41		92 00	513 28
"Teal"	648 39	31 40	5 00		253 70	938 49
"Ukataw"	900 00	426 63	66 29	8 61	1,220 00	2,621 53
"Velma"	900 00	215 88	8 84	4 82	605 00	1,734 54
"Vera"			11 23			11 23
"We-Two"	611 29	104 73	8 25		182 82	907 09
"Whipp"	144 00				16 00	160 00
"W.T."	216 23	47 50	3 60		66 00	333 33
"York"	145 16				16 13	161 29

DETAILED STATEMENT OF FISHERIES PATROL SERVICE EXPENDITURE, 1922-23—Continued

Establishments and Accounts	Paylist	Board or Prov'n.	Repairs		Supplies		Clothing	Sundry	—	Total
	\$ cts.	\$ cts.	Hull	Engine	Engine	Deck	Stewards	\$ cts.	\$ cts.	\$ cts.
<i>Departmental Boats—</i>										
"Anina"	786 10		65 94	108 04	36 91	3 75		4 30	378 82	
"Babin No. 1"	772 26		8 15	20 67	30 50	18 06		9 70	1 001 22	
"Babine No. 2"	1,857 90		3 35	39 53	34 35	17 18		12 50	1 007 21	
"Black Raven"	1,517 24		75 50	358 02	93 03	123 49		139 87	3,659 43	
"Bonita"			210 82	475 34	107 17	20 55	97 18	1 30	3,294 58	
"Cohoe"			39 00	218 52	106 90	38 15	48 14	156 05	1,856 14	
"Egret"	1,676 00		843 44	266 50	134 76	37 20	51 83	249 11	3,381 18	
"Elk"	3,395 00		270 35	97 97	57 09	2 55	38 00	150 81	4,634 59	
"Espe"	5,003 57	1,514 92	613 85	1,138 58	510 59	94 52	303 47	363 63	14,375 84	
"Foam"	5,040 00	14 85	547 23	223 47	46 54	86 48	45 73	7,100 17	52,014 77	
"Givenchy"	26,525 42	8,334 29	1,206 81	4,527 46	1,564 34	913 46	619 71	996 89	3,096 30	
"Gull"	1,260 00		732 30	396 51	101 20	31 15	97 30	318 05	2,590 11	
"Hawk"	1,553 78		465 04	73 53	114 60	71 71	25 80	196 13	3,183 59	
"Heron"	1,963 45		802 06	71 61	77 37	18 13	48 96	116 75	3,393 63	
"Humming Bird"			22 77	5 75	7 91			3 20		
"Kayak"	862 12		26 53	223 26	151 07	32 15	101 46	43 01	1,785 21	
"Linnec"	1,520 16		419 64	17 23	54 56	1 85	31 91	43 73	2,107 08	
"Marfish"	6,199 37	1,508 71	1,869 29	766 28	477 85	169 76	331 32	823 49	13,253 13	
"Merlin"			308 88	44 81	69 92	25 11	25 38	52 80	1,777 84	
"Merrysea"	4,750 23		1,366 19	198 60	187 52	18 47	27 94	266 73	6,954 15	
"Ptarmigan"				5 38				1 25		
"Semialuno"	2,107 33		361 38	68 86	25 74	2 55	14 69	88 11	2,775 09	
"Sean"	5,040 00		948 89	204 93	69 92	55 41	71 67	385 43	7,152 30	137,425 91
General Account.....	107,595 40	9,320 45	4,776 10	9,849 59	5,433 49	1,866 56	2,194 96	1,314 39	31,841 44	208,039 04
										92 83
<i>Eastern Division</i>	22,030 70	43 76	6,356 03	2,115 73	1,198 50	414 38	411 60	168 17	2,518 02	36,238 75
Quebec.....			34 20	37 18				58 50		440 45
Central Div.....	9,473 38	2,660 01	6,842 79	179 15	321 94	803 36	180 63	299 18	178 29	21,852 05
British Columbia Division.....	107,595 40	9,320 45	33,845 66	9,849 59	5,433 49	1,866 56	2,194 96	1,314 39	31,841 44	208,039 04
General Account.....										92 83
Totals.....	139,109 43	12,024 22	47,078 68	12,181 65	6,953 93	3,084 30	2,787 19	1,781 74	34,689 08	296,663 12

SUMMARY

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DETAILED STATEMENT OF FISH CULTURE EXPENDITURE, 1922-23

Hatcheries	Salaries	Mainten- ance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia—</i>				
Bedford.....	1,260 00	3,943 71	5,203 71	
Lindloff.....		468 55	468 55	
Long Beach Pond.....		92 03	92 03	
Margaree.....	3,600 00	5,154 82	8,754 82	
Margaree Pond.....	392 84	2,407 85	2,800 69	
Middleton.....	2,415 00	4,128 09	6,543 09	
Windsor.....	1,320 00	2,216 38	3,536 38	
	8,987 84	18,411 43		27,399 27
<i>Prince Edward Island—</i>				
Kelly's Pond.....	2,505 00	2,296 56		4,801 56
<i>New Brunswick—</i>				
Grand Falls.....	2,430 00	2,267 36	4,697 36	
Miramichi.....	2,394 39	9,148 11	11,542 50	
Miramichi Pond.....		2,107 34	2,107 34	
Nepisiquit.....		425 62	425 62	
New Mills Pond.....	449 50	4,913 12	5,362 62	
Restigouche.....	2,820 00	2,405 09	5,225 09	
Sparkle.....		491 86	491 86	
St. John.....	2,490 00	7,347 98	9,837 98	
St. John Pond.....		10,259 57	10,259 57	
Tobique.....		348 81	348 81	
	10,583 89	39,714 86		50,298 75
<i>Quebec—</i>				
Gaspe.....	705 00	114 53	819 53	
Tadoussac.....	390 00	886 03	1,276 03	
York.....		572 92	572 92	
	1,095 00	1,573 48		2,668 48
<i>Ontario—</i>				
Collingwood.....	3,840 00	8,063 76	11,903 76	
Kenora.....	3,932 44	9,240 57	13,173 01	
Kingsville.....	3,915 00	6,444 07	10,359 07	
Newcastle.....		150 00	150 00	
Port Arthur.....	3,780 00	2,448 30	6,228 30	
Sarnia.....	3,900 00	5,150 36	9,050 36	
Southampton.....	3,573 31	5,910 20	9,483 51	
Thurlow.....	5,325 00	6,596 68	11,921 68	
Warton.....	4,140 00	3,280 47	7,420 47	
	32,405 75	47,284 41		79,690 16
<i>Manitoba—</i>				
Dauphin River.....	1,635 00	6,521 47	8,156 47	
Dauphin River Spawn Camp.....		1,121 96	1,121 96	
Gull Harbour.....	2,580 00	2,015 34	4,595 34	
Winnipegosis.....	2,670 00	14,243 56	16,913 56	
	6,885 00	23,902 33		30,787 33
<i>Alberta—</i>				
Banff.....	2,820 00	3,494 77	6,314 77	
Spray Lakes.....		1,572 55	1,572 55	
	2,820 00	5,067 32		7,887 32
<i>Saskatchewan—</i>				
Qu'Appelle.....	2,415 00	4,137 84		6,552 84

DETAILED STATEMENT OF FISH CULTURE EXPENDITURE, 1922-23—*Concluded*

Hatcheries	Salaries	Maintenance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>British Columbia—</i>				
Anderson.....	130 00	7,196 62	7,326 62	
Babine.....		8,435 53	8,435 53	
Cowichan.....	356 45	6,523 11	6,879 56	
Cultus.....	70 00	4,980 63	5,050 63	
Gerrard.....	30 00	1,944 62	1,974 62	
Harrison.....	125 63	12,744 22	12,869 85	
Kennedy.....	130 00	7,063 61	7,193 61	
Lloyd's Creek Eyeing St'n.....		1,418 95	1,418 95	
New Westminster.....		49 42	49 42	
Pemberton.....	140 00	14,465 73	14,605 73	
Pitt.....	75 00	4,386 48	4,461 48	
Rivers Inlet.....	115 00	13,541 37	13,656 37	
Skeena.....	199 70	11,939 39	12,139 09	
Stuart.....	120 00	6,772 46	6,892 46	
General.....	6,896 90	3,586 71	10,483 61	
	*8,388 68	105,048 85		113,437 53
<i>General Account.....</i>	4,260 00	4,546 74		8,806 74

SUMMARY

Nova Scotia.....	8,987 84	18,411 43	27,399 27
Prince Edward Island.....	2,505 00	2,296 56	4,801 56
New Brunswick.....	10,583 89	39,714 86	50,298 75
Quebec.....	1,095 00	1,573 48	2,668 48
Ontario.....	32,405 75	47,284 41	79,690 16
Manitoba.....	6,885 00	23,902 33	30,787 33
Alberta.....	2,820 00	5,067 32	7,887 32
Saskatchewan.....	2,415 00	4,137 84	6,552 84
British Columbia.....	*8,388 68	105,048 85	113,437 53
General Account.....	4,260 00	4,546 74	8,806 74
	80,346 16	251,983 82	332,329 98

* B.C. Salaries mostly distributed through maintenance.

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DETAILED STATEMENT OF FISHERIES PROTECTION SERVICE EXPENDITURE, 1922-23

Establishments and Accounts	Pay-list \$ cts.	Board or Prov'n \$ cts.	Fuel \$ cts.	Repairs		Supplies		Clothing \$ cts.	Sundry \$ cts.	— \$ cts.	Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.				
<i>General Account.</i>	52 32								68 29		120 61
<i>Eastern Division—</i>											
“Arleux”	18,253 47	3,520 66	7,289 74	546 32	494 90	918 51	2,109 13	404 40	975 35	34,610 51	
“Arras”	20,516 27	5,461 53	9,562 19	508 66	327 64	827 73	1,660 98	212 92	538 20	39,748 98	
“Hochelaga”	600 00			14 85		Cr. 2,438 11	Cr. 117 65			Cr. 2,357 38	
“Petrel”							Cr. 117 65			Cr. 117 65	
<i>Great Lakes—</i>											
“Becancour”	39,369 74	8,982 19	16,851 93	1,069 83	822 54	Cr. 711 87	3,138 36	617 32	1,533 55		71,884 48
“Lavolette”	5,667 20	2,490 22	2,628 62	666 83	247 79	239 77	213 94	82 84	459 51	12,696 72	
“Lavaltrie”	7,058 16	2,179 65	3,652 98	578 10	71 63	201 39	635 41	79 29	674 22	15,199 83	
						4 86				4 86	
<i>Western Division—</i>											
“Armentières”	12,725 36	4,669 87	6,281 60	1,244 93	319 42	446 02	849 35	162 13	1,133 73		27,901 41
“Estevan”	180 00						10 86				
“Mataspina”	29,987 06	5,355 92	8,917 10	363 37	2,724 30	976 10	974 97	663 38	66 49	257 35	
“Stadacona”	480 00					2 32	28 49	3 70	78 90	78 90	
“Thiepval”	26,882 63	4,888 65	7,013 91	171 13	140 14	679 52	516 27	504 05	1,824 12	53,193 60	
									17 57	475 10	
									804 06	42,727 80	
	57,529 69	10,244 57	15,931 01	534 50	2,864 44	1,657 94	1,473 61	1,171 13	3,114 52		96,732 75

SUMMARY

<i>General Account.</i>	52 32								68 29		120 61
<i>Eastern Division.</i>	39,369 74	8,982 19	16,851 93	1,069 83	822 54	Cr. 711 87	3,138 36	617 32	1,533 55		71,884 48
<i>Great Lakes.</i>	12,725 36	4,669 87	6,281 60	1,244 93	319 42	446 02	849 35	162 13	1,133 73		27,901 41
<i>Western Division.</i>	57,529 69	10,244 57	15,931 01	534 50	2,864 44	1,657 94	1,473 61	1,171 13	3,114 52		96,732 75
	109,677 11	23,896 63	39,064 54	2,849 26	4,006 40	1,392 09	5,461 32	1,950 58	5,850 09		196,639 25

APPENDIX No. III.

The following is a statement of the different kinds of licenses issued by the different Inspectors during the 1922-23 season:—

MAGDALEN ISLANDS, QUEBEC—S. T. GALLANT, Inspector

Kind of Licenses—	Number of Licenses Issued
Lobster fisherman's.....	373
Lobster packing.....	25
Lobster packing extensions.....	19
Smelt fishing.....	9
Spec. fishery for herring trap nets.....	47
Spec. fishery for seine net fishing.....	22
Receipt books.....	
	<hr/> 476

PRINCE EDWARD ISLAND—S. T. GALLANT, Inspector

Lobster fisherman's.....	1,831
Lobster packing.....	186
Lobster packing extensions.....	110
Fish cannery.....	6
Quahaug fishery.....	2
Trap net.....	4
Smelt gill net.....	284
Smelt bag net.....	221
Oyster fishery.....	241
Receipt books.....	
	<hr/> 2,775

NOVA SCOTIA DISTRICT No. 1—A. C. MACLEOD, Inspector

Lobster fisherman's.....	2,144
Lobster packing.....	52
Lobster packing extensions.....	43 (1 cancelled)
Fish cannery.....	1
Trap nets.....	47
Special angling permits.....	30
Salmon trap net, pound net or weir.....	134 (2 cancelled)
Salmon gill net or drift net.....	28
Smelt gill net.....	162
Smelt bag net.....	45
Oyster fishery.....	84
Receipt books.....	
	<hr/> 2,727 (2 cancelled)

NOVA SCOTIA DISTRICT No. 2—D. H. SUTHERLAND, Inspector

Lobster fisherman's.....	3,007
Lobster packing.....	73
Lobster packing extensions.....	61
Fish cannery.....	6
Trap net.....	167
Drag seine.....	179
Salmon net.....	20
Special angling permits.....	21
Shad gill net or drift net.....	20
Salmon trap net, pound net or weir.....	1
Salmon gill net or drift net.....	4
Smelt gill net.....	152
Smelt bag net.....	193
Oyster fishery.....	106
Special lobster pound licenses.....	1
Special lobster pound certificates.....	50
Scallop fishery.....	3
Herring weir.....	21
Receipt books.....	
	<hr/> 3,974

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NOVA SCOTIA, DISTRICT No. 3—H. H. MARSHALL, Inspector

Lobster fisherman's.....	3,480	
Lobster packing.....	35	
Lobster packing extensions.....	7	
Fish cannery.....	10	(1 cancelled)
Trap net.....	216	(1 cancelled)
Special angling permits.....	325	(2 cancelled)
Shad gill net or drift net licenses.....	Nil	
Smelt gill net.....	95	
Smelt bag net.....	29	
Scallop fishery.....	249	
N. S. herring weir.....	80	
Special lobster pound.....	6	
Lobster pound certificates.....	151	
Lease of Long Beach pond.....	1	
Receipt books.....		
	4,525	(4 cancelled)

NEW BRUNSWICK, DISTRICT No. 1—J. F. CALDER, Inspector

Lobster fisherman's.....	609	
Fish cannery.....	6	
Salmon fishery.....	10	
Shad gill net or drift net.....	9	
Scallop fishery.....	10	
Herring weir.....	492	(1 cancelled)
Permits to dig soft shell or long neck clams.....	126	
Special lobster pound.....	4	
Lobster pound certificates.....	251	
Lease of Dark Harbour.....	1	
Receipt books.....		
	1,266	(1 cancelled)

NEW BRUNSWICK, DISTRICT No. 2—R. CROCKER, Inspector

Lobster fisherman's.....	2,000	
Lobster packing.....	177	
Lobster packing extensions.....	50	
Fish cannery.....	1	
Quahaug fishery.....	118	
Salmon fishery.....	450	(1 cancelled)
Salmon net permits.....	50	
Bass gill net.....	Nil	
Shad gill net or drift net.....	31	
Gaspereau pound net or trap net.....	55	
Smelt gill net.....	138	
Smelt bag net.....	3,216	(44 free)
Oyster fishery.....	467	
Bass fishery.....	62	
Herring weirs.....	Nil	
Lobster pound licenses.....	2	
Lobster pound certificates.....	129	
Receipt books.....		
Oyster permits.....	150	
	6,917	(1 cancelled, 44 free)

NEW BRUNSWICK, DISTRICT No. 3—H. E. HARRISON, Inspector

Whitefish fishery.....	10	
Salmon fishery.....	112	
Salmon net permits for non-tidal waters.....	123	
Sturgeon fishery.....	9	
Shad gill net or drift net.....	254	
Smelt gill net.....	1	
Smelt bag net.....	Nil	
Bass fishery.....	16	
Receipt books.....		
	525	

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MANITOBA—J. B. SKAPTASON, Inspector

Special fishery.....	2,077 (1 cancelled)
Commercial sturgeon.....	134
Domestic sturgeon.....	22
Special angling permits for non-residents.....	22
Settler's permits.....	778
Receipt books.....	2,213 (3 cancelled)
	<hr/> 3,033 (1 cancelled)

SASKATCHEWAN—G. C. MACDONALD, Inspector

Domestic sturgeon.....	8
Commercial sturgeon.....	7
Domestic.....	93 (1 cancelled and 1 free)
Commercial and fisherman's.....	438 (1 free and 1 cancelled)
Indian and half-breed permits.....	483
Receipt books.....	545 (2 cancelled)
	<hr/> 1,029 (2 cancelled, 2 free)

ALBERTA—J. D. WILSON, Inspector

Fish cannery.....	1
Special angling permits.....	4,331 (13 cancelled and 6 free)
Domestic fishery.....	131 (8 cancelled)
Commercial and fisherman's.....	621 (6 cancelled)
Indian and half-breed permits.....	294
Receipt books.....	758
	<hr/> 5,378 (27 cancelled and 6 free)

BRITISH COLUMBIA—J. A. MOTHERWELL, Inspector

Fish cannery.....	36 (1 cancelled)
Special angling permits.....	52
Indian permits.....	174
Abalone fishery.....	2
Crab fishery.....	98
Smelt or sardine.....	50
B.C. gill net, drift net or drag seine licenses operated in conjunction with power boats.....	451 (1 cancelled)
B.C. herring or pilchard gill net or drift net licenses.....	38
B.C. herring drag seine.....	Nil
B.C. herring purse seine.....	30 (1 cancelled)
Herring drag seine or purse seine.....	Nil
Sturgeon fishery.....	3
Salmon trolling.....	1,517 (4 cancelled)
Salmon gill net or drift net.....	4,490 (12 cancelled)
Salmon trap net.....	4
Salmon purse seine.....	148 (6 cancelled)
License to a captain of a salmon purse seine boat, drag seine or herring purse seine.....	139
B.C. salmon drag seine.....	40 (4 cancelled)
Salmon cannery.....	65
Salmon curing.....	63 (2 cancelled)
B.C. license to a person engaged in cold storage or fish packing to buy fresh fish from fishermen.....	126 (1 cancelled)
Reduction works.....	4
B.C. boat licenses to buy salmon from fishermen.....	248
Whale factory licenses.....	3
Salmon curing permits.....	1
Grayfish licenses.....	1
Special seal destruction permits.....	23
	<hr/> 7,806 (32 cancelled)

YUKON TERRITORY

Special fishery.....	21
	<hr/> 21

MODUS VIVENDI LICENSES

Atlantic coast.....	91
Pacific coast.....	148
	<hr/> 239

Total number issued.....40,680 (70 cancelled and 52 free)

APPENDIX No. IV.

LIST of United States Fishing vessels which entered Canadian ports on the Atlantic Coast during the year ended December 31, 1922.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
Acushla.....	70	23	12	Bait, repairs, supplies, shelter, tranship fish.....	
Aeolus.....	16	8	6	Supplies, shelter, land sick man.....	
Agnes.....	65	19	4	Shelter.....	
Alice Velicia.....	16	10	1	".....	
Alice & Wilson.....	16	10	8	" , ice.....	
Allen C.....	15	3	1	".....	
American.....	93	23	8	Ice, bait, shelter.....	
Angeline C. Nunan.....	58	21	3	Shelter.....	
A. Pratt Andrew.....	33	6	1	Ice.....	
Arthur James.....	95	21	1	Shelter.....	
Audrey & Theo.....	15	6	1	" , tranship fish.....	
Avalon.....	69	21	11	Bait, land fish, oil, ice, repairs, shelter, supplies.....	37
Aviator.....	210	9	1	Shelter.....	
Bay State.....	81	25	8	Ice, repairs, bait, shelter.....	
Benjamin A. Smith.....	75	25	11	Ice, supplies, shelter, bait.....	
Benjamin M. Wallace.....	49	19	1	Shelter.....	
Bettina.....	66	17	5	".....	
Catherine.....	77	27	8	Ice, shelter, bait, repairs, dories.....	
Catherine Burke.....	68	19	22	Shelter, bait.....	
Cavalier.....	96	22	6	Supplies, to ship men, bait.....	
Commonwealth.....	93	25	4	Shelter.....	
Constellation.....	87	19	11	" , bait.....	
Corinthian.....	97	25	12	Bait, land fish, oil, repairs, shelter.....	93
Dawn.....	79	25	4	Shelter.....	
Edith C. Rose.....	70	23	5	Repairs, supplies, shelter, to ship men.....	
Edith Silveria.....	47	19	5	Land sick man, food, shelter.....	
Eleanor.....	36	9	3	Coal, shelter.....	
Elizabeth Howard.....	90	23	7	Bait, supplies, shelter.....	
Elizabeth M. King.....	13	8	2	Shelter, tranship fish.....	
Elizabeth W. Nunan.....	48	17	5	Shelter, repairs.....	
Elk.....	66	19	9	Bait, oil, supplies, shelter.....	
Elmer E. Gray.....	71	21	23	Bait, ice, repairs, shelter, supplies.....	
Elsie G. Silva.....	50	21	5	Ice, supplies, shelter, tranship fish.....	
Elsie.....	98	25	2	Shelter, to ship crew, water.....	
Ellen T. Marshall.....	75	21	6	" , supplies.....	
Evelyn & Ralph.....	16	16	12	" , landing fish.....	
Fannie E. Prescott.....	74	19	5	Bait, ice, oil, supplies.....	
Flor Del Mar.....	55	7	1	Shelter.....	
Flora L. Oliver.....	59	21	9	Bait, repairs, shelter, supplies.....	
Frances S. Grueby.....	94	25	4	Bait, ice, shelter.....	
Frank S. Pierce.....	12	7	3	Shelter, supplies.....	
Funchal.....	20	11	1	Shelter.....	
Gaspe.....	176	10	1	".....	
Gertrude de Costa.....	61	19	2	Repairs, shelter.....	
Glover.....	58	25	1	Shelter.....	
Governor Foss.....	88	23	4	".....	
Governor Marshall.....	60	23	22	Bait, ice, land fish, shipping seamen, supplies, repairs.....	71
Good Luck.....	55	19	17	Shelter, tranship fish.....	
Grace Darling.....	43	15	3	".....	
Harmony.....	66	18	10	" , bait.....	
Harvard.....	72	19	3	".....	
Hazel R. Hines.....	79	16	3	To ship men, ice, supplies.....	
Helena.....	40	17	5	Shelter.....	
Helja Silva.....	77	20	4	".....	
Henrietta.....	62	19	2	".....	
Henry Ford.....	90	25	7	Bait, dories, ice, shelter, supplies.....	
Herbert Parker.....	78	23	13	Bait, shelter, supplies.....	
Hesperus.....	79	25	12	Bait, land fish, repairs, shelter, supplies.....	70

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LIST of United States Fishing vessels which entered Canadian ports on the Atlantic Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Hope Leslie.....	19	13	8	Bait, repairs, shelter, supplies.....	cwt.
Hortense.....	43	19	5	Ice, shelter.....	
Imperator.....	79	23	11	Bait, ice, land fish, shelter, supplies, tranship fish.....	70
Ingomar.....	85	20	3	Landing seaman's corpse, shelter, supplies.....	
Jeanette.....	51	19	1	Bait, ice, shelter, supplies.....	
Joffre.....	80	25	4	".....	
John J. Fallon.....	60	19	5	Shelter.....	
John J. Taylor.....	60	19	1	".....	
Joseph Warner.....	28	7	1	".....	
Joseph Warner.....	11	7	6	Ice, shelter.....	
Killarney.....	73	21	6	Bait, ice, shelter, landing sick man.....	
L. A. Dunton.....	94	24	3	" , landing fish, shelter, supplies.....	112
Lark.....	121	23	1	Shelter.....	
Laura Enos.....	17	5	9	Ice, shelter.....	
Laura Goulart.....	73	21	1	Repairs.....	
Leonora Silveria.....	51	20	2	Shelter.....	
Leslie.....	20	6	3	Ice, shelter.....	
Lincoln.....	12	9	4	".....	
Lois H. Corkum.....	34	12	12	Salt, shelter, supplies, repairs, land fish.....	55
Louis Enos.....	9	5	1	Shelter.....	
Louisa B. Marshall.....	74	21	3	Bait, shelter.....	
Louisa R. Sylva.....	92	23	13	Bait, ice, shipping men, shelter, supplies.....	
Lucia.....	43	17	6	Shelter.....	
Margaret.....	72	19	1	".....	
Margaret.....	62	19	1	".....	
Marion McLoon.....	11	7	9	" , supplies.....	
Marshall Foch.....	64	23	10	Bait, ice, repairs, supplies.....	
Mary de Costa.....	62	19	2	Shelter, landing fish.....	250
Mary E. O'Hara.....	49	24	8	".....	
Mary F. Curtis.....	65	23	34	Bait, ice, salt, shipped men, shelter, supplies.....	
Mary T. Fallon.....	48	16	6	Shelter.....	
Mayflower.....	113	25	12	Bait, ice, shelter, supplies.....	
Medric.....	189	21	1	Repairs.....	
Medric.....	11	6	1	Shelter.....	
Melta Comet.....	22	6	3	Land fish, shelter.....	55
Mildred Robinson.....	73	21	4	Bait, repairs, land fish.....	32
Minerva.....	13	6	8	Ice, shelter, supplies.....	
Monarch.....	83	25	15	Bait, ice, shelter, ship men, supplies.....	
Natalie Hammond.....	51	21	6	Repairs, shelter, ship men.....	
Nickerson.....	23	10	6	Shelter.....	
Nirvana.....	50	12	4	".....	
Nyoda.....	28	12	4	".....	
Oretha F. Spinney.....	87	24	4	Bait, land fish.....	66
Orion.....	39	14	3	Repairs, shelter.....	
Osion.....	73	14	1	Shelter.....	
Patriot.....	12	8	1	".....	
Philip P. Manta.....	43	19	9	".....	
Pilgrim.....	63	18	3	Bait, land fish, shelter.....	2
Pilot.....	18	8	1	Shelter.....	
Pioneer.....	128	19	1	Land sick seaman.....	
Pioneer.....	53	19	8	Shelter.....	
Plover.....	208	21	1	Repairs.....	
Progress.....	61	23	1	Dories.....	
Puritan.....	96	24	2	Bait, ice.....	
Republic.....	48	22	6	Bait, ice, land fish, supplies.....	108
Restless.....	35	8	4	Shelter.....	
Restless.....	15	8	1	".....	
Rex.....	75	23	15	Bait, ice, land sick man, land fish, shelter, supplies.....	132
Rhodora.....	70	19	1	Shelter.....	
Ripple.....	96	24	2	Ice, supplies, water.....	
Robert & Arthur.....	67	23	6	Land fish, shelter.....	500
Ruth.....	49	18	4	Shelter, water.....	
Ruth & Margaret.....	78	23	7	Ice, land fish, supplies.....	21

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LIST of United States Fishing vessels which entered Canadian ports on the Atlantic Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
Sadie M. Nunan.....	36	20	6	Shelter.....	
Sibyl.....	18	8	5	Land fish, shelter.....	7
Snipe.....	208	21	3	Repairs.....	
Stiletto.....	91	20	17	Bait, shelter.....	
Sunapee.....	18	9	3	Shelter.....	
Surf.....	119	25	4	".....	
Teazer.....	59	21	9	Land fish, shelter, ship men.....	92
Thelma.....	28	12	3	Shelter.....	
Thomas S. Gorton.....	92	25	8	Bait, ice, repairs, shelter, ship men. supplies.....	
T. M. Nicholson.....	90	23	4	Bait, repairs, shelter.....	
Verna G.....	12	7	2	Shelter, tranship fish.....	
Vida M. McKeown.....	83	19	1	".....	
Waldo L. Stream.....	66	21	1	Repairs.....	
Waltham.....	44	22	4	Shelter.....	
Wesley W. Sennet.....	11	6	4	Ice, shelter, supplies.....	
Yankee.....	96	25	2	Shelter.....	

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
A.K.....	7	2	1	Bait.....	
Active.....	4	2	1	".....	
Actor.....	7	2	2	" , land fish.....	20
Adele.....	3	2	1	".....	
Adeline.....	6	2	1	Land fish.....	760
Advance.....	4	3	10	Bait, landing fish, shelter.....	87
Agnes.....	17	5	3	" , shelter.....	
Alaska.....	44	13	1	For orders.....	
Alawa.....	4	2	1	Land fish.....	20
Albatross.....	40	13	9	Bait, land fish, shelter.....	1,487
Alf.....	28	4	1	Land fish.....	2,720
Alfa.....	12	5	5	Bait.....	
Alice B.....	13	5	13	" , land fish.....	80
Alpha.....	3	3	1	Land fish.....	140
Alten.....	43	16	6	Bait, land fish, for orders.....	7,540
America.....	25	11	11	Bait.....	
America.....	11	4	1	Land fish.....	460
Amundsen.....	16	6	1	Bait.....	
Annie.....	11	4	1	Land fish.....	460
Anna J.....	22	6	1	".....	3,080
Anna J. Larsen.....	25	11	5	Bait.....	
Anita Phillips.....	14	2	1	Shelter.....	
Antler.....	22	5	10	Bait, land fish, for orders.....	120
Antler.....	13	4	1	".....	340
Arcade.....	14	4	12	".....	2,540
Arctic.....	29	11	1	Land fish.....	40
Arctic.....	4	3	1	".....	40
Arthur.....	3	1	1	".....	40
Atlantic.....	25	11	3	Bait, land fish.....	2,580
Atlas.....	31	8	2	".....	840
August.....	16	3	2	For orders, shelter.....	
Augusta.....	19	4	1	Land fish.....	1,660
Aurora.....	13	5	10	" , bait.....	300
Baltic.....	20	5	1	".....	540
Bartolome.....	4	3	1	".....	1,040
Beaver.....	17	5	14	" , bait.....	240
Bernice A.....	30	6	1	".....	500
Betty.....	14	5	1	".....	260

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LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Bluebird.....	4	1	1	"	cwt. 40
Bob. F. 857 L.....	1	2	2	Unknown.....	
Bravo.....	4	2	1	"	
Bring Gold.....	12	5	1	Land fish.....	1,200
Brothers.....	13	5	1	"	2,060
Bryan.....	15	4	1	"	360
Burnett.....	30	3	1	"	400
Cal. C. 834.....	3	3	2	Shelter, unknown.....	
California.....	20	5	4	Bait, land fish.....	560
Cape Clear.....	13	4	7	"	440
Carolan.....	18	6	1	Land fish.....	640
Caroline.....	5	2	1	Shelter.....	
Castor.....	6	2	1	"	
Cedric.....	19	5	2	For orders, land fish.....	540
Chancellor.....	13	5	6	Land fish, shelter, bait.....	840
Chimera.....	9	3	16	Shelter, bait.....	
Christine.....	4	1	1	Unknown.....	
Cito.....	4	2	1	"	
Clara.....	4	2	1	Land fish.....	180
Clarion.....	15	3	1	Under seizure.....	
Commonwealth.....	60	15	1	Land fish.....	1,800
Companion.....	30	4	1	"	1,820
Condor.....	4	2	1	"	40
Confidence.....	22	3	1	"	40
Constitution.....	39	13	3	" , bait, for orders.....	1,180
Convention.....	20	5	8	"	560
Cora.....	4	3	1	"	360
Corona.....	19	6	5	" , bait.....	320
Crescent.....	8	4	4	" , shelter, supplies.....	1,040
Dagney.....	4	3	1	"	60
Daily.....	26	6	1	"	2,540
Daisy.....	18	6	1	"	120
Defense.....	20	5	6	" , bait.....	960
Democrat.....	27	6	1	"	1,560
Dependent.....	4	3	1	"	100
Dewage.....	4	1	1	Shelter.....	
Diamond T.....	8	2	1	Land fish.....	2,340
Dip.....	4	1	3	Unknown, land fish.....	6
Discovery.....	10	4	13	Land fish, bait, unknown.....	80
Dolphin.....	5	2	1	Unknown.....	
Dora H.....	15	5	7	Bait, land fish, unknown.....	25
Eagle.....	27	5	1	Land fish.....	1,160
Eagle.....	15	6	1	"	520
Eastern Point.....	4	3	1	"	880
Eidsvold.....	15	5	9	" , bait.....	1,160
Eleanora.....	16	5	5	Bait.....	
Elfin.....	4	3	1	Land fish.....	60
Elsie.....	14	5	1	"	120
Elliott.....	28	8	1	"	260
Emma.....	4	4	1	"	60
Emblem.....	4	2	1	"	360
E. Neilson.....	15	4	1	"	1,200
Enterprise.....	7	3	13	Bait.....	
Eureka.....	4	2	1	Land fish.....	60
Evolution.....	17	9	9	" , bait.....	180
Fairway.....	19	5	5	"	1,460
Faith.....	7	3	4	Bait.....	
F. C. Hergert.....	15	5	9	Land fish, bait.....	320
Fisher.....	14	5	1	"	180
Flamingo.....	13	5	7	Bait.....	
Flattery.....	10	3	1	Land fish.....	560
Flora & Margaret.....	15	5	9	" , bait, for orders.....	920
Florence.....	38	11	1	"	460
Fortuna.....	21	8	11	Bait, land fish.....	100
Fortuna.....	15	5	1	"	
Forward.....	18	4	2	" , land fish.....	2,460
Frane.....	4	3	1	Land fish.....	660
Fremont.....	10	5	8	" , shelter.....	280
G. A. 331.....	2	1	1	Unknown.....	

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
George B.....	34	8	1	Shelter.....	
Get the Hook.....	10	1	1	".....	
Glacier.....	12	4	1	Land fish.....	920
Gladstone.....	23	7	1	".....	1,400
Gony.....	12	5	2	Bait.....	
Grant.....	5	2	1	Land fish.....	100
Grayling.....	16	5	5	" , bait.....	1,280
Groth.....	7	3	1	".....	920
Hanna.....	11	3	1	Shelter.....	
Happy.....	12	4	1	Land fish.....	1,380
Harding.....	28	5	1	Bait.....	
Harding.....	19	5	13	Land fish, bait.....	400
Harding.....	15	4	1	".....	100
Harvestor.....	15	5	3	" , bait.....	40
Hazel.....	7	4	1	".....	380
Hazel H.....	21	5	10	" , bait.....	160
Helen D.....	8	3	1	".....	100
Helgeland.....	56	15	1	".....	3,460
Herbert B.....	13	7	1	".....	20
Hiawatha.....	6	3	2	Shelter.....	
Hi Gill.....	11	4	1	Land fish.....	400
Hilda.....	10	3	6	" , shelter.....	177
I. K. L.....	7	2	2	Bait, unknown.....	
Imperial.....	19	5	3	Land fish.....	440
I. X. L.....	7	2	1	Unknown.....	
Jean.....	9	2	1	Bait.....	
Jennie F. Decker.....	16	8	8	" , land fish.....	13
Johannah.....	16	5	1	Land fish.....	360
J. P. Todd I.....	4	2	1	".....	580
June.....	15	5	1	".....	1,060
June F. 643.....	4	2	11	" , bait, unknown.....	35
K. 377.....	4	2	1	".....	220
Katella.....	16	5	9	" , bait.....	140
Kayak.....	8	3	1	Bait.....	
Kennebec.....	13	3	1	Land fish.....	80
Kodiak.....	38	13	7	" , bait.....	1,920
Lady Luck.....	9	4	1	Shelter.....	
Lancing.....	16	4	1	Land fish.....	1,100
La Paloma.....	14	11	11	" , bait.....	380
Laura.....	7	3	3	".....	80
Lebanon.....	14	5	11	" , for orders.....	160
Leif II.....	21	3	1	".....	2,140
Lenor.....	14	4	1	".....	1,400
Liberty.....	44	15	10	" , bait, for orders.....	2,820
Liberty.....	4	2	1	Bait.....	
Lincoln.....	23	5	3	" , land fish.....	780
Lincoln.....	4	3	1	Land fish.....	640
Louise.....	16	6	1	Bait.....	
Lovera.....	4	2	1	Land fish.....	40
Lummen.....	10	4	1	".....	540
Madeline J.....	21	5	10	Bait.....	
Margaret T.....	10	3	1	Land fish.....	100
Mars.....	9	4	1	".....	980
Mary.....	16	8	17	Bait, tried to sell fish.....	
Mary K.....	7	1	1	Supplies.....	
Mary L.....	7	2	1	Bait.....	
Mermaid.....	19	5	10	" , for orders, land fish.....	140
M. Grant.....	5	3	1	".....	
Mildred.....	19	8	7	".....	
Mildred II.....	31	8	8	Land fish.....	640
Mira.....	7	3	1	".....	1,100
Mobile.....	4	2	1	".....	20
Molde.....	7	3	1	".....	20
Morengen.....	17	5	1	".....	1,420
Myrtle.....	9	4	7	Bait.....	
National.....	20	5	6	" , land fish.....	900
Neptune.....	6	2	1	Land fish.....	360
Niclaros.....	13	5	1	".....	400
Nomad.....	15	5	8	" , bait.....	220
Norma.....	6	3	1	".....	680

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LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Nornen.....	6	3	1	"	cwt.
Norland.....	19	5	1	"	80
North.....	9	4	11	" , bait, for orders.	1,540
North Pole.....	5	2	1	"	160
Nuzon.....	19	2	1	Shelter.....	140
O.K.....	7	1	1	Bait.....	
Oak Leaf.....	5	2	1	Land fish.....	220
Ocean Queen.....	24	4	1	Bait.....	
Olympic.....	30	11	2	"	
Omaney.....	34	13	1	Land, fish.....	3,080
Onah.....	18	5	8	" , bait.....	760
Orient.....	60	11	1	Shelter.....	
Orient.....	48	13	4	Land fish, bait.....	800
Panama.....	34	13	2	"	4,240
Pauline J.....	16	4	1	Bait.....	
Peggy.....	5	3	1	Land fish.....	80
Pelican.....	17	5	1	"	1,240
Pershing.....	18	5	11	" , bait.....	40
Petrel.....	67	7	1	Shelter.....	
Phoenix.....	15	2	1	Land fish.....	1,040
Pioneer.....	48	13	1	"	4,460
Pioneer III.....	26	5	11	" , bait, unknown.....	480
Polaris.....	45	15	2	"	2,660
President.....	24	6	2	"	1,240
Presto.....	14	5	1	Bait.....	
Primrose.....	3	1	1	"	
Rainier.....	4	3	1	Land fish.....	200
Rambler.....	10	3	1	Bait.....	
Raven.....	6	3	1	Land fish.....	100
Reform.....	4	3	1	"	180
Regal.....	13	2	1	Bait.....	
Reliance.....	14	3	1	Land fish.....	980
Reliance.....	7	3	5	" , bait.....	660
Reliance L.....	19	5	1	"	2,000
Republic.....	57	15	1	Shelter.....	
Republic.....	51	15	1	Land fish.....	6,460
Rescue.....	6	4	1	"	40
Restitution.....	24	5	7	" , bait.....	480
Rival.....	4	3	1	"	340
Roald.....	12	3	5	Bait.....	
Roald Amunsden.....	16	6	1	Land fish.....	1,400
Rolfe.....	10	5	1	"	120
Rosario.....	16	6	6	Bait.....	
Royal.....	15	5	2	" , land fish.....	600
Roosevelt.....	13	5	7	"	
Ruth.....	4	2	1	"	
Sadie K.....	13	5	3	" , land fish.....	240
Sammy.....	8	3	7	"	
Samson.....	7	3	1	Land fish.....	660
Scandia.....	79	13	1	"	4,340
Scout.....	4	2	1	"	220
Seattle.....	55	15	2	" , bait.....	2,740
Senator.....	11	6	1	"	1,840
Sentinel.....	21	6	2	" , bait.....	920
Seymour.....	44	15	1	Shelter.....	
Sherman.....	18	5	1	Land fish.....	2,020
Sidney.....	6	3	1	Shelter.....	
Signal.....	13	4	1	Land fish.....	100
Siloam.....	16	8	14	Bait.....	
Sirius.....	21	5	1	Land fish.....	360
Sitka.....	50	15	1	"	640
Snooks.....	5	1	1	Shelter.....	
Spencer.....	17	5	1	Land fish.....	340
S. & S.....	4	2	1	"	100
Stanley.....	15	3	1	"	420
Star.....	7	3	4	" , bait.....	1,380
Success.....	4	3	1	"	300
Summer.....	34	15	1	"	3,340
Sun Wing.....	15	4	1	"	160
Superior.....	16	5	8	Bait.....	

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
Superior.....	10	5	1	"	
Swift.....	7	2	2	"	
T. 489.....	5	3	1	Land fish.....	80
T. 603.....	4	3	1	"	100
T. 981.....	5	1	1	Shelter.....	
Tahoma.....	18	11	5	Land fish, bait.....	3,080
Tatoosh.....	24	6	2	"	2,480
Teddy J.....	13	4	1	"	1,500
Texas.....	16	5	10	" , bait.....	180
Thelma II.....	26	5	6	"	520
Thor.....	4	2	1	"	40
Tillicum.....	21	5	4	" , bait, for orders.....	2,400
Tom & Al.....	57	15	3	"	2,900
Topsy.....	3	1	1	Shelter.....	
Tordenskjold.....	39	13	5	Land fish, bait.....	2,880
Tot 363 L.....	2	1	2	Unknown.....	
Tyee.....	12	4	1	Land fish.....	440
W. 221.....	4	2	1	Shelter.....	
Unimak.....	10	3	1	Land fish.....	580
Uramus.....	15	5	5	" , bait.....	660
Valid.....	8	3	6	"	320
Valid.....	4	3	1	Bait.....	
Valera.....	6	3	8	"	
Valorous.....	22	5	1	Land fish.....	220
Vamoose.....	16	1	1	Shelter.....	
Vansee.....	43	15	1	Land fish.....	3,840
Veba.....	6	2	1	Bait.....	
Venus.....	4	3	1	Land fish.....	1,240
Vesta.....	13	4	1	"	1,300
Victor.....	2	2	1	Unknown.....	
Viking.....	11	3	1	Land fish.....	920
Viking.....	6	3	1	"	240
Virginia.....	33	5	2	" , supplies.....	1,240
Vivian.....	9	3	1	"	660
Volunteer.....	21	5	3	" , bait.....	840
Volunteer.....	19	5	8	Bait.....	
Wabash.....	6	3	1	Land fish.....	680
Washington.....	24	8	1	"	600
Washington.....	15	5	4	" , bait.....	360
Wave.....	7	3	1	"	260
Westener.....	4	2	1	Shelter.....	
Westford.....	17	5	6	Land fish, bait.....	800
Westford.....	25	5	1	Bait.....	
White Star.....	17	5	2	" land fish.....	680
Wild Rose.....	4	2	1	Land fish.....	40
Wilhelmina.....	17	5	9	Bait.....	
Wilson.....	19	5	8	" land fish.....	140
William D. Muir.....	65	13	1	Shelter.....	
Wireless.....	19	5	9	Land fish, bait.....	40
Woodrow.....	23	5	4	"	420
Yakutat.....	41	13	9	" " , for orders.....	1,600
Yaukee.....	10	3	1	"	140
Yellowstone.....	22	5	2	" , bait.....	800

FIFTY-SEVENTH
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1923-24

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1924

*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,
G.C.M.G., M.V.O., Governor General and Commander in Chief of the
Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:)

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-seventh annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

P. J. A. CARDIN,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,
OTTAWA, AUGUST, 1924.

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DEPUTY MINISTER'S REPORT

To the Hon. P. J. A. CARDIN,

Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Fifty-seventh Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1924.

The report deals with the following subjects:—

Review of the Fisheries of 1923.

Operation of the Fish Inspection Act.

Operation of the Meat and Canned Foods Act.

Fisheries Intelligence Service.

Fish Publicity Campaign.

Fishing Bounty.

Fish Culture.

Work of the Biological Stations.

Educational Effort.

Natural History Observations.

Appendices to the report include the following:—

Reports of Inspectors of Fisheries.

Fisheries Expenditure and Revenue.

Fishways and Removal of Obstructions.

Work of C.G.S. *Arleux* and *Arras*.

Summary of Licenses issued.

Entries of United States Fishing Vessels.

REVIEW OF THE FISHERIES OF 1923

The catch of fish on both the Atlantic and Pacific coasts during the year was slightly less than in the previous year, while the production for Ontario and the West is slightly higher. The total marketed value of the fisheries of Canada for the year was about three quarters of a million dollars greater than in 1922.

The following table shows the marketed value of the fisheries, by provinces, compared with that of the preceding year:—

	1923	1922
Nova Scotia.....	\$ 8,448,385	\$ 10,209,258
New Brunswick.....	4,548,535	4,685,660
Prince Edward Island.....	1,754,980	1,612,599
Quebec.....	2,100,412	2,089,414
Ontario.....	3,159,427	2,858,122
Manitoba.....	1,020,595	908,816
Saskatchewan.....	286,643	245,337
Alberta.....	438,737	331,239
British Columbia.....	20,795,914	18,849,658
Yukon Territory.....	11,917	10,107
	<hr/>	<hr/>
	\$ 42,565,545	\$ 41,800,210

ATLANTIC FISHERIES

Cod, Haddock, Hake and Pollock.—There were 2,242,000 cwts. of these fish landed during the year compared with 3,045,000 cwts. in the preceding year. A decrease in the catch of cod accounts chiefly for the difference. There were 1,773,000 cwts. of cod landed, which is 547,000 cwts. less than in the year previous. There was a curtailment in the Lunenburg fishing fleet, only eighty vessels operating, which is the smallest number for twenty years and nineteen less than in 1922. The catch of haddock was about the same as in the previous year. Only 93,000 cwts. of hake and 71,000 cwts. of pollock were landed. These are decreases of 169,000 cwts. and 83,000 cwts. respectively from the landings of the year before.

Mackerel, Herring and Sardines.—There was a decrease of these fish of 410,000 cwts. in the catch, only 1,102,000 cwts. being taken. The quantity of herring taken was 691,000 cwts., which was 80,000 cwts less than the year before. Pickled herring reached a very low value, selling for \$4 per barrel. The smoked herring business at Grand Manan was a failure owing to few herring suitable for smoking being taken at the weirs. It would seem that while herring of a suitable size for smoking were plentiful outside in the waters of the bay they were not driven into the weirs by their natural enemies, as is usually the case.

The mackerel catch decreased from 251,000 cwts. in 1922 to 142,000 cwts. The spring run of these fish was small and prices were low, the latter being due to the fact that there was a heavy run off the New England shore and a number of dealers had large stocks in cold storage from the 1922 run, for which a high price had been paid. Conditions, however, improved somewhat towards the end of the year.

The sardine catch shows a decrease. There were 135,000 barrels taken compared with 245,000 barrels in 1922. Owing to the scarcity of these fish the price increased considerably and the sardine fishermen were much better off than for some seasons.

Other Sea Fish.—The quantity of halibut decreased by 11,000 cwts., only 20,000 cwts. being taken. Swordfish were landed in larger numbers, the catch being 14,000 cwts. Albacore and flounders show increased catches, but there was a decrease in the catch of tomcod.

Shellfish.—The lobster season opened under very bad conditions, the drift ice around the coast being such as to prevent the setting of traps at the commencement of the season. Fishing conditions improved, however, later on, with the result that each of the provinces show an increased catch except Nova Scotia, the decrease in the latter province being only 900 cwts.

The total catch was 382,000 cwts., as compared with 364,000 cwts. in 1922. The catch by provinces was:—

Nova Scotia.....	173,000 cwts.
New Brunswick.....	74,000 "
Prince Edward Island.....	97,000 "
Quebec.....	38,000 "

Prince Edward Island shows the largest increase, of about 10,000 cwts.

As the season advanced the market for the canned article became poor, with the result that the live lobster industry received considerable impetus, especially in New Brunswick and Prince Edward Island. On account of the success attained by the shippers of live lobsters during the 1923 season it is thought that a larger proportion of the catch will be shipped alive from these districts in future.

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The catch of oysters was about 4,000 barrels greater in 1923, 21,000 barrels being taken.

Clams and scallops were taken in about the same quantities as in the preceding year.

River Spawning Fish.—The catch of salmon was 46,000 cwts., or an increase over the preceding year of 9,000 cwts.

The quantity of smelts taken decreased by 19,000 cwts., only 63,000 cwts. being caught. This was due to the open season during the early part of the winter, when the ice did not form and it was impossible to set nets. New Brunswick was the chief loser in this fishery, the other provinces producing practically the same quantity as in the previous year. On account of the scarcity of these fish the price received by the fishermen was the highest for some time, with the result that the marketed value was somewhat greater than in the preceding year.

The quantity of alewives taken was slightly greater than in the preceding year, the decrease in the Nova Scotia catch being more than made up by the increased catch in the St. John, N.B., district.

INLAND FISHERIES

There was an increase in the production of the inland fisheries, with the exception of whitefish and tullibee in the province of Manitoba. While the catch of whitefish decreased in lake Winnipeg, there was an increase in Ontario, Saskatchewan, and Alberta, which brings the catch up to the same as the previous year. The decrease in the catch of this species in lake Winnipeg is attributed by some to the fact that the fish did not school and kept scattered, making it hard for the fishermen to locate them.

An increase of about 19,000 cwts. is noted in the catch of pickerel.

There was a decrease in the catch of blue pickerel in Ontario, only 32,000 cwts. being landed compared with 63,000 cwts. in 1922.

An increase in the catch of herring in Ontario is shown, 108,000 cwts. being taken, or an increase of 33,000 cwts.

In the St. John River district of New Brunswick the production of fish was slightly greater.

PACIFIC FISHERIES

Salmon.—There was a slightly increased catch of salmon during the year, 1,515,000 cwts. being taken. The pack is greater by 24,351 cases and amounts to 1,314,677 cases. The pack of sockeye salmon was 334,647 cases, an increase of 35,033; that of cohoes 112,044 cases, an increase of 9,199 cases. A decrease of 141,047 cases is noted in the pack of pinks, while 418,055 cases of chums were canned; or an increase of 159,851 cases.

Halibut.—The catch of halibut gives an increase of 41,483 cwts., there being about 335,000 cwts. landed. This constitutes a record for landings of this species in British Columbia ports.

Of the quantity landed in 1923 American vessels brought in 203,666 cwts.

Herring.—There was a slight increase in the catch of herring, 1,035,823 cwts. being taken. As usual the bulk of this catch was dry salted for the Orient, where a ready market and good prices were obtained.

Pilchards.—The catch of pilchards was about the same as in the previous year. The fish are quite plentiful on the west coast of Vancouver island at certain seasons of the year, but the demand is not sufficient to encourage the capture of them in larger quantities.

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Whales and Seals.—Three whaling stations were in operation during the year at Kyuquot, Rose Harbour, and Naden Harbour. The total catch was 455 whales, which is an increase of 268 over the previous year.

There were 4,424 seals taken during the year compared with 930 in 1923.

INSPECTION OF FISH

The inspection of certain kinds of fish and the packages in which they are marketed was carried on during the season of 1923 under authority of the Fish Inspection Act. The Act makes it necessary for packers to have both fish and barrels in accordance with its requirements and empowers inspectors to examine such whenever and wherever it is necessary and convenient. The work was carried on by a staff of three permanent and twelve temporary inspectors on the Atlantic coast, and two temporary inspectors on the Pacific coast.

On the Atlantic coast sixty-six thousand barrels and nine hundred and twenty pails of pickled fish, and almost thirty thousand boxes of smoked herring, passed through the hands of the inspectors who examined them as to the quality and construction of barrels and the weight, quality, grade and curing of the fish in accordance with the requirements of the Act.

On the Pacific coast, the large and growing trade in dry-salted herring between British Columbia and the Orient was supervised by the department's inspectors.

Provided the container is of the standard size and filled to capacity with properly cured fish, a certificate to that effect is given by the inspector to the shipper of each consignment as it is inspected. This system of inspection is proving to be very satisfactory to the trade.

During the past winter herring season in British Columbia, there were inspected two hundred and forty-four thousand boxes, each containing four hundred pounds of herring. Of that total, one hundred and seventy thousand three hundred and seventy-eight boxes were packed on the west coast and seventy-three thousand six hundred and twenty-two boxes on the east coast of Vancouver island. When it is noted that at an average price, f.o.b. British Columbia, of six dollars per box the total value of this trade amounts to almost one and one-half million dollars, its importance as a branch of the fishing industry of the Pacific province is immediately apparent. In addition to that quantity of dry salted herring, there were also packed in the Scotch style thirteen hundred and forty-four barrels, nine hundred and twenty-five half-barrels and fifteen hundred and sixty-four small packages. These were all duly inspected.

The very great improvement in the strength, tightness and good quality of the barrels now being used under this system of inspection, and the very marked improvement in the quality of the fish packed, is resulting in much greater use being made of the inspectors on the part of not only fishermen but dealers and shippers.

INSPECTION OF CANNERIES AND CANNED FISH

The inspection of fish canneries of all kinds, the raw materials used therein, the whole process of canning, the canned product itself and the labelling and designating of such was carried on during the year as usual under the provisions of the Meat and Canned Foods Act. This inspection is carried on by the department's staff of Fishery Overseers as part of their ordinary duties. The inspection aims at the extension of the trade by improving the quality of the product, and the protection of the public by preventing the packing of

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unsound fish, and seeing that all cans of fish are correctly labelled. Imported canned fish also is subject to inspection under the Act, and must be in accordance with the provisions thereof as to soundness, weight and proper designation.

FISHERIES INTELLIGENCE SERVICE

Under this service there was carried on during the season of 1923:—

1. The collection of monthly statistics of the sea fisheries, and the compilation of such in a summarized form for publication through the press each month.

2. The publication of a quarterly bulletin containing the statistics in detail. The bulletin is distributed to the trade and all directly concerned. The statistics are practically all collected by the regular fishery officers while performing their other duties as such, and at very little additional cost.

3. The collecting of information concerning supplies of bait day by day along certain stretches of the coast during the spring and summer months. The information is gathered by the officers of the department, who send it by telegram daily to certain ports where it is posted up for the information of Masters of fishing vessels and those looking for bait.

FISH PUBLICITY CAMPAIGN

From October to March last, the department assisted a committee of the Canadian Fisheries Association to carry on a campaign of advertising for the purpose of increasing the consumption of fish and thereby ultimately improving the condition of the fishing industry generally. The campaign was short and the ground has really only been broken. Evidence is on hand, however, showing that sales of fish increased very markedly as a result of the publicity work, and there need be no doubt that further efforts along the lines will result beneficially to the industry by further increasing the consumption of fish.

FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1923, payment was made on the following basis:—

To owners of vessels entitled to receive bounty—\$1 per registered ton: payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty—\$9 each.

To owners of boats measuring not less than 13 feet keel—\$1 per boat.

To boat fisherman entitled to receive bounty—\$7.60 each.

There were 8,915 bounty claims paid. In the preceding year there were 11,204 bounty claims paid.

The total amount paid was \$159,916.80, allocated as follows:—

To 508 vessels and their crews, \$45,664.95.

To 8,407 boats and their crews, \$114,251.85.

FISHING BOUNTY EXPENDITURE FOR 1923-24

County	Boats	Men	Amount \$ cts.	Vessels	Tons	Av. Tons	Men	Amount \$ cts.	Paid
<i>Nova Scotia</i>									
Annapolis.....	148	237	1,949 20	1	60	60	19	231 00	149
Antigonish.....	148	214	1,774 40	.....	.....	.....	.....	.....	148
Cape Breton.....	217	368	3,000 30	19	282	15	56	786 00	236
Cumberland.....	2	2	17 20	1	11	11	2	29 00	3
Digby.....	326	529	4,341 90	2	24	12	7	87 00	328
Guysboro.....	520	817	6,695 45	36	545	15	144	1,841 00	556
Halifax.....	1,026	1,294	10,846 90	48	884	18	262	3,242 00	1,074
Inverness.....	283	569	4,582 65	10	143	14	44	539 00	293
Kings.....	33	47	390 20	.....	.....	.....	.....	.....	33
Lunenburg.....	579	738	6,158 55	128	7,175	56	1,733	22,772 00	707
Pictou.....	40	62	499 95	.....	.....	.....	.....	.....	40
Queens.....	113	174	1,428 65	11	137	13	39	488 00	124
Richmond.....	304	510	4,150 75	14	231	16	54	717 00	318
Shelburne.....	402	730	5,945 50	17	336	20	235	2,416 15	419
Victoria.....	267	392	3,210 20	5	89	17	22	287 00	272
Yarmouth.....	85	181	1,460 60	10	510	51	96	1,374 00	95
Total.....	4,493	6,864	56,452 40	302	10,427	34	2,713	34,809 15	4,795
<i>New Brunswick</i>									
Charlotte.....	229	409	3,314 90	4	50	12	12	158 00	233
Gloucester.....	108	248	1,990 55	184	2,631	14	827	10,065 80	292
Kent.....	11	19	155 40	6	64	11	15	199 00	17
Northumberland.....	.....	.....	.....	2	21	10	5	66 00	2
Restigouche.....	2	6	47 60	.....	.....	.....	.....	.....	2
St. John.....	12	15	126 00	.....	.....	.....	.....	.....	12
Total.....	362	697	5,634 45	193	2,766	14	859	10,488 80	558
<i>P. E. I.</i>									
Kings.....	181	251	2,050 35	3	42	14	8	114 00	184
Prince.....	416	789	6,225 65	1	12	12	2	30 00	417
Queens.....	98	209	1,679 65	2	27	13	3	54 00	100
Total.....	695	1,249	9,955 65	6	81	13	13	198 00	701
<i>Quebec</i>									
Bonaventure.....	337	588	4,466 05	3	33	11	9	114 00	340
Gaspé.....	1,976	3,819	30,307 40	1	10	10	5	55 00	1,977
Matane.....	99	135	1,100 25	.....	.....	.....	.....	.....	99
Saguenay.....	445	789	6,335 65	.....	.....	.....	.....	.....	445
Total.....	2,857	5,331	42,209 35	4	43	11	14	169 00	2,861
Grand total.....	8,407	14,141	114,251 85	508	13,317	26	3,599	45,664 95	8,915

FISH CULTURE

The fish cultural operations of the department during the calendar year, 1923, were mainly devoted to the more important fresh water and anadromous food fishes, such as Atlantic salmon in the East, whitefish, salmon trout and pickerel in the interior and the Pacific salmon in the West.

A general improvement in the roads and the more extensive use of automobiles has brought trout streams that were previously considered rather remote within reach of a vastly increased number of anglers. Consequently a much heavier toll is taken, not only in the streams that are near the centres of population, but from those at a distance which were previously beyond the reach of the majority of the residents.

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To meet this increase in trout fishing, the propagation of the species was taken up on a more extensive scale than in the past and a comparatively large portion of the best angling waters of Nova Scotia was thoroughly prospected by hatchery officers with a view to locating places where trout eggs are obtainable in reasonable numbers. The area, however, is so extensive that but a comparatively small portion of it could be covered this year, and no large and productive spawning grounds were located, but valuable information regarding certain areas was obtained, which will greatly assist in future operations. For the first time speckled trout eggs were collected in Boundary and Violin lakes, near Nelson, in southern British Columbia. The species was introduced into these waters in recent years and have done so well that nearly one million eggs were secured from them this season.

The Atlantic salmon eggs were, as is customary, obtained from fish which were purchased from the commercial catch or were caught in nets operated under contract for the purpose. Practically all the salmon trout eggs and a portion of the whitefish and pickerel eggs were obtained from the commercial catch of the gill-net fishermen, and the balance from fish captured in nets operated by hatchery officers. The eggs of Pacific salmon were obtained in the usual way from fish that were intercepted in the streams on their way to the upper spawning beds.

The collection of speckled trout eggs was the largest since 1917, and was further increased by purchase and exchange. All previous collections of whitefish were exceeded in the bay of Quinte; around Pelee islands, lake Erie; in the lake of the Woods and in lake Winnipegosis. The total collection exceeded that of last year by one hundred million. The pickerel collection was the largest on record, being one hundred and fifty-four million in excess of last year. The collection of sockeye eggs compared favourably with the best of recent years. The collection in the Fraser River watershed was the fifth highest on record and could have been increased had hatchery accommodation been available. It is significant that over eleven million eggs were obtained from fish that were captured in and around the entrance of the ditch that leads from the ponds of the Harrison Lake hatchery, from which a considerable number of fry were liberated four years ago.

The total collection of eggs was two hundred and forty-one and one-half million in excess of that of last year. This collection was augmented by the purchase of trout eggs, thus bringing the total receipt of eggs to over two hundred and forty-three million in excess of 1922. The following summary gives, by species, the total receipt of eggs during the year ended December 31, 1923:—

Atlantic salmon.....	22,383,000
Rainbow trout.....	20,500
Cutthroat trout.....	619,860
Steelhead salmon.....	43,650
Kamloops trout.....	2,240,500
Sockeye salmon.....	102,386,100
Spring salmon.....	1,073,000
Coho salmon.....	2,008,000
Pink salmon.....	4,003,900
Chum salmon.....	2,900
Speckled trout.....	2,060,820
Whitefish.....	698,860,000
(a) Salmon trout.....	39,681,500
Cisco.....	22,182,000
(b) Pickerel.....	388,180,000
	<hr/> 1,285,745,730

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Brought forward 1,285,745,730

Rainbow trout from the state of New Hampshire in exchange for Atlantic salmon.....	115,000
Rainbow trout from the Southside Sportmen's Club, Long Island, N.Y., donation.....	36,000
Cutthroat trout from the United States Bureau of Fisheries in exchange for Atlantic salmon.....	250,000
Steelhead salmon from the United States Bureau of Fisheries in exchange for Atlantic salmon.....	330,000
Speckled trout from the State of New Hampshire in exchange for Atlantic salmon.....	1,335,500
Speckled trout purchased.....	325,000
Loch Leven trout from the United States Bureau of Fisheries in exchange for Speckled trout.....	411,000
	<hr/> 2,802,500
	1,288,548,230

(a) Out of this number 1,414,000 were shipped to the Quebec Provincial Government.

(b) Out of this number 10,000,000 were shipped to the North Dakota Game and Fish Commission.

In addition to the above the following were received:—

Cutthroat trout fry from the Cranbrook District Rod and Gun Club in exchange for Kamloops trout.....	25,000
Black bass, two and a half to five inches in length, from the North Dakota Game and Fish Commission in exchange for Pickerel.....	975
Crappie, two to five inches in length, from the North Dakota Game and Fish Commission in exchange for Pickerel.....	400

PLANTING OF EYED EGGS

The planting of eyed sockeye salmon eggs on selected portions of what were at one time the most important spawning areas of the Upper Fraser watershed and other isolated waters was continued on a more extensive scale than ever before. Under existing conditions, this is the only feasible method whereby many extensive and important spawning grounds can be restocked. These grounds are so far removed from existing hatcheries that it is quite out of the question to transfer fry from the hatcheries to them. Plantings of this nature were made from the Pemberton hatchery in the Quesnel lake, the Anderson and Seton lakes and the Stuart lake areas of the Upper Fraser; from the Cultus Lake hatchery to the Shuswap lakes area, all in the Fraser River watershed; from the Anderson Lake hatchery to Great Central and Sproat lakes, Vancouver island, as well as numerous smaller plantings in other places.

STOCKING OF BARREN LAKES

The stocking of barren lakes from which mature fish are shut off by falls and other barricades was continued on a more extensive scale. The returns that are apparent from such plantings are most gratifying and the various hatchery officers in the more remote and mountainous districts gave considerable time to an examination of their surroundings with a view to a further extension of such work. Lakes of this nature are usually teeming with natural food and, as they contain few, if any, mature fish or enemies, they are, in effect, natural retaining ponds on an extensive scale.

REARING OF FRY

Retention and feeding of fry was given greater attention, and the distribution of advanced fry and fingerlings was greater than ever before, exceeding the record distribution of 1922 by twenty per cent. The expansion in this direction that has taken place in recent years is indicated, as follows:—

	Number distributed.
1921.....	22,253,000
1922.....	28,672,900
1923.....	35,412,000

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TRANSFER OF MATURE FISH

Numerous lakes in the Prairie Provinces that do not contain fish and are not suitable for the better species handled in the hatcheries were stocked with yellow perch, catfish, pike and suckers by transfer from other bodies of water. Selected waters in British Columbia also received allotments of small black bass in the same way from waters in the province in which they have been established. White Bear or Carlyle lake, near Carlyle, and Ketepwa lake, near Fort Qu'Appelle, Sask., were also stocked with black bass and crappie fingerlings, which were secured through the North Dakota Game and Fish Commission from the overflowed lands adjacent to the Mississippi river, in exchange for pickerel eggs from the Kenora hatchery.

DESTRUCTION OF COARSE FISH

Since commercial fishing started in lake Winnipegosis, Manitoba, the suckers and other coarse fish have rarely brought sufficient prices to pay for handling. Consequently, the fishermen have devoted their energies to the taking of whitefish and other marketable species, the result being that the coarse fish increased in numbers out of all proportion to the better varieties. The predominance of the coarse fish also tends to keep down the better varieties and further upset the balance of nature. On the other hand, there are numerous small prairie lakes in which no fish are indigenous and any variety is considered a boon by the local residents. Consequently, suckers were trapped as they were ascending some of the streams in the southern part of lake Winnipegosis to spawn. These fish were destroyed and the eggs of such as were ripe when they were caught were utilized for stocking the poorer class of prairie lakes, above referred to. In addition to the eggs a considerable number of the fish themselves were transferred to the lakes in question.

Forty-two thousand suckers were destroyed in lake Winnipegosis and twenty-eight thousand coarse fish, principally squaw fish, were destroyed in Cultus lake during the season.

ACCLIMATIZATION

Spring salmon of the Pacific have been caught in lake Ontario in all stages of growth, from the fry a few weeks old to mature fish in spawning condition, over twenty pounds in weight. Eastern whitefish up to four and one-half pounds in weight have been caught in British Columbia lakes. Black bass from the East are firmly established in Christina lake in southern British Columbia and in several lakes in Vancouver island. Eastern speckled trout abound in one or more lakes in British Columbia, the Atlantic salmon of various sizes, from fingerlings to fresh run fish in prime condition, and kelt on their return to sea after spawning have been caught in the Cowichan river, British Columbia, within the last two years. One angler of Duncans has captured no less than seven adult Atlantic salmon in this stream.

EXPANSION

Owing to a lack of the necessary appropriation, no expansion in the way of new establishments was accomplished, but operations from existing hatcheries were extended in the way of prospecting undeveloped areas with a view to collecting eggs and in improving the facilities and extending operations at existing hatcheries. The old hatchery at Pitt Lake, which was a temporary structure, was replaced by a log building 44 feet by 40 feet, with a capacity of four million five hundred thousand eggs. An eyeing station with the capacity of one million five hundred thousand eggs was provided in rented quarters in Nelson, B.C., and an experienced hatchery officer was loaned to direct the operation of a small hatchery built by the Rod and Gun Club of Cranbrook, B.C.

INSPECTIONS

Thorough inspections were made by District Inspector Harrison of a large part of the interior of southern British Columbia and of the Quesnel lake district for the purpose of ascertaining their requirements and possibilities from a fish culture standpoint. A large portion of the interior of Nova Scotia was covered by Chief Inspector Finlayson, and the headwaters of the Northeast Margaree river and of Little river, Cheticamp and the lakes of that region were covered by District Inspector Catt. These last two inspections were for the purpose of determining the possibilities of the respective districts from the standpoint of collecting speckled trout eggs. At the present time the department is operating thirty-three main hatcheries, nine subsidiary hatcheries and four salmon retaining ponds. The output from these establishments during 1923 was over twenty per cent in excess of that of 1922, and is shown by species and provinces in the following statement:—

HATCHERY OUTPUT, BY PROVINCES, OF EGGS, FRY AND OLDER FISH DURING 1923

Nova Scotia—			
Atlantic salmon.....	7,933,650		
Rainbow trout.....	96,500		
Speckled trout.....	522,800		
			8,552,950
New Brunswick—			
Atlantic salmon.....	8,902,395		
Rainbow trout.....	407		
Speckled trout.....	319,409		
			9,222,211
Prince Edward Island—			
Atlantic salmon.....	985,842		
Speckled trout.....	209,292		
			1,195,134
Ontario—			
Atlantic salmon.....	148		
Spring salmon.....	175,480		
Whitefish.....	335,595,000		
Salmon trout.....	29,063,850		
Cisco.....	1,850,000		
Pickarel.....	169,570,000		
			536,254,478
Manitoba—			
Whitefish.....	150,080,000		
Pickarel.....	41,590,000		
			191,670,000
Saskatchewan—			
Whitefish.....	24,470,000		
Black bass.....	898		
Crappie.....	365		
			24,471,263
Alberta—			
Atlantic salmon.....	142,333		
Rainbow trout.....	14,732		
Cutthroat trout.....	408,769		
Steelhead salmon.....	260,919		
Sockeye salmon.....	4,503		
Spring salmon.....	2,346		
Coho salmon.....	21,080		
Chum salmon.....	1,953		
Salmon trout.....	178,064		
			1,034,699
British Columbia—			
Atlantic salmon.....	629,588		
Rainbow trout.....	10,905		
Cutthroat trout.....	135,836		
Steelhead salmon.....	41,791		
Kamloops trout.....	2,075,500		
Sockeye salmon.....	89,261,250		
Spring salmon.....	2,094,046		
Coho salmon.....	1,675,700		
Pink salmon.....	3,713,900		
Chum salmon.....	2,892,370		
Speckled trout.....	56,720		
Whitefish.....	12,002,000		
			114,589,615
			886,990,350

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WORK OF BIOLOGICAL STATIONS IN CANADA

ATLANTIC STATION, ST. ANDREWS, N.B.

The subjects investigated by the various workers were as follows:—

Miss Helen Battle, Western University: The effect of extreme physical conditions on the course of the development in fishes.

Miss F. M. Burwash, University of Toronto: Occurrence of iodine in the haddock.

Miss J. T. Henderson, McGill University: The life history of the gribble, *Limnoria*.

Dr. A. G. Huntsman, Director: Supervision.

Dr. F. S. Jackson, McGill University: The comparative histology of the pancreas in fishes.

Prof. A. B. Klugh, Queen's University: The culture of fresh-water entomostaca, and the measurement of light in aquatic habitats.

Prof. A. P. Knight, Chairman of the Board: General supervision; problems in lobster canning.

Mr. A. H. Leim, University of Toronto: The life-history of the shad.

Miss M. Lenz, Queen's University: The effect of various bacteria in decomposing the meat of the lobster.

Mr. N. A. McCormick, University of Toronto: The insulin content of the pancreas and related glands in fishes and other marine animals.

Mr. R. H. McGonigle, University of Toronto: The distribution of the shipworm and the gribble.

Mr. D. J. McLeod, Queen's University: The effect of various bacteria in decomposing the meat of the lobster.

Mr. E. C. Noble, University of Toronto: The insulin content of the pancreas and related glands in fishes and other marine animals.

Prof. E. E. Prince, Secretary-Treasurer of the Board: Administration.

Prof. G. B. Reed, Queen's University: The early stages of bacterial decomposition of the lobster meat.

Mr. W. C. M. Scott, University of Toronto: The embryology of the liver, the pancreas and the islets of Langerhans in bony fishes.

Mr. R. G. Sinclair, Queen's University: A study of fresh-water entomostaca.

Miss E. A. Smith, Queen's University: The rate of migration of the bacteria of decomposition from the intestinal tract of fish.

Mr. M. I. Sparks, University of Toronto: The effect on marine animals of extreme temperatures.

Miss E. M. Taylor, University of Toronto: The physical factors determining the hatching of fish eggs.

Miss H. I. Wilton, Queen's University: The growth of the clam under various conditions.

Miss M. H. Wilton, Queen's University: The growth of the clam under various conditions.

The Royal Ontario Museum of Zoology sent to St. Andrews three members of its staff, Dr. E. M. Walker, Mr. A. Kurata and Mr. S. Logier, who were given the facilities of the laboratory for the collection of material, in particular of fishes, of which a large number of casts were made. Dr. D. Fairchild and Mr. G. B. Fairchild, of Washington, D.C., were granted the facilities of the laboratory for a part of the month of August.

The weekly and monthly collections of plankton and hydrographic material at established points in the Passamaquoddy region, and daily records of the temperature of water and air at St. Andrews have been continued.

FIELD INVESTIGATIONS

An expedition was organized under Dr. Huntsman for investigating the strait of Belle Isle and neighbouring waters in relation to the cod and other fisheries, support for this being given by the Fisheries Branch. The *Prince* operated in the region of the strait from the latter part of July to the middle of September. The C.G.S. *Arleux*, with Dr. Huntsman, Dr. L. Gilchrist of the University of Toronto, and Mr. A. C. Gardiner of Cambridge University (representing Newfoundland), made a general survey during August and September of the region from Cabot strait and Anticosti island through the strait of Belle Isle and around the eastern and southern coasts of Newfoundland. The results obtained demonstrated the dependence of the cod fishery on the hydrographic conditions.

Professor Knight in the early part of the season continued his investigation of the condition of lobster canneries.

Mr. H. C. White, of Queen's University, followed up the results of the planting of trout fry in two brooks near Aylmer, Ont., determining their habits, their enemies, and the number of survivors.

Under a grant from the Council for Scientific and Industrial Research, Mr. R. H. McGonigle, of the University of Toronto, made a survey of the Atlantic coast from the bay of Fundy to the estuary of the St. Lawrence in order to determine the extent of the activities of the marine borers that destroy the wood of piles, buoys, etc.

The Station undertook to co-operate with the Department of Public Works in the examination of test blocks put out in selected harbours along the coast to show the character and rate of attack by marine boring animals. Miss Jean Henderson took over the examination of these blocks.

The study of the currents by means of drift bottles, in which the countries represented on the International Committee on Deep Sea Fisheries Investigations co-operate, has been continued. Two thousand three hundred and twenty drift bottles were put out during 1923 in the following series: From cape Pine south, through the courtesy of the Newfoundland Government; across the St. Pierre bank, by Dr. Ed. LeDanois with the French cruiser *Ville D'Ys*; across the Labrador current north of Belle Isle by the C.G.S. *Arleux*; at a number of points across the strait of Belle Isle by the *Prince*; across Cabot strait by the *Prince*; and three series along the coast of Nova Scotia by the *Prince*.

PACIFIC STATION, NANAIMO, B.C.

Prof. O'Donoghue acted as director for the season of 1923.

The subjects investigated by the various workers were as follows:—

Mr. C. Berkeley: Biochemical studies on molluscs and fishes.

Mr. Jas. Dauphinee, University of British Columbia: Arginase in the tissues of fishes.

Miss E. S. Dowding, University of Alberta: Fluorescence in marine algæ.

Mr. H. A. Dunlop, University of British Columbia: The growth of salmon; pelagic copepods.

Prof. A. Hunter, University of Toronto: Arginase in the tissues of fishes.

Prof. F. J. Lewis, University of Alberta: The conifers.

Prof. C. H. O'Donoghue, University of Manitoba: Migration of starfish; systematic study of Holothurians, Nudibrachs, Testibrachs and Bryozoa.

Mr. H. C. Wailes, Vancouver, B.C.: Marine and fresh water Protozoa.

Mr. A. Fee, of the University of British Columbia, was given the facilities of the laboratory for the summer in return for assistance with the collections.

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Trips of exploration were made to Union bay, Discovery passage, Friday harbour, and Victoria.

Mr. R. E. Foerster investigated the life-history of the sock-eye salmon in Harrison and Cultus lakes, with particular reference to the food and enemies of the young.

The Station co-operated with the Department of Public Works in studying the work of the marine boring animals that attack wood. Mr. Dunlop undertook the examination of the test blocks sent in from time to time from the series placed at suitable points on the coast by the engineers of the department.

The retiring director, Dr. C. McLean Fraser, represented the Station at the Pan-Pacific Scientific Congress held in Australia in August, 1923.

In the course of the past year the membership of the Biological Board was increased by the addition of three members, two, Mr. A. Hanfield Whitman of Halifax, N.S., and Mr. John Dybhavn from Prince Rupert, from the fishing industry, and one, Mr. J. J. Cowie, from the administrative staff of the department.

EDUCATIONAL EFFORT

A sum of seventy thousand dollars has been placed at the disposal of the Biological Board for the purpose of establishing stations on the Atlantic and Pacific coasts at which will be given to fishermen and others directly concerned practical demonstrations in the best methods of processing all kinds of fish, and from which will emanate to the villages and settlements all over the coast the knowledge acquired at the stations. The centre of the educational effort on the Atlantic coast will be at Halifax. It is intended that the Halifax station will contain a chemical laboratory, a bacteriological laboratory, a model fish canning plant, a model fish drying plant, a model smoke house and means for demonstrating the most approved methods of curing various kinds of fish. It is planned further to build up a museum furnished with models and photographs of boats and vessels of different types used in the fisheries in the principal fish producing countries of the world, also of nets, lines, traps and other fishing gear, of curing establishments, etc., and the utensils used therein, and where lectures will be given on all phases of the fishing industry. In short, it is intended to make the station a centre from which definite practical information can be obtained upon all subjects connected with the business of fishing and the preparation of fishery products.

In connection with the stations, the Biological Board plans to arrange for public addresses to be given in different places along the coast by men who are recognized leaders in the fish business. Definite efforts will also be made to publish educational pamphlets on different fishery subjects. Ultimately, as the utility of the station becomes recognized and a demand arises in outlying points for technical instruction, short courses of instruction will be provided in different localities.

It is anticipated that the board will establish its educational centre on the Pacific at Prince Rupert.

NATURAL HISTORY OBSERVATIONS

In the course of the summer and fall of 1923, the department's naturalist continued his observations along the shores of Cumberland, Pictou, Antigonish, Richmond and Cape Breton counties, Nova Scotia, with a view to gathering knowledge of the sex, size, weight and spawning condition of lobsters in these waters. He also continued his investigations into the condition of the scallops in Mahone Bay, N.S. In addition to these, the naturalist carried on investi-

gations into the run of salmon to the Nova Scotia rivers emptying into the strait of Northumberland and of the seasonal changes this fish undergoes in passing from the sea to its spawning beds. As a result of these observations much interesting and useful information has been placed in the hands of the department.

The prosecution of our fisheries is a hazardous business and year by year the toll paid in human life is considerable. I regret to report, therefore, that during the year under review thirty-one fishermen were lost; twenty-three on the Atlantic and eight on the Pacific.

I am, sir,

Your obedient servant,

A. JOHNSTON,
Deputy Minister of Marine and Fisheries.

APPENDIX I.

REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, PROVINCE OF
NOVA SCOTIA, FOR 1923

Each year reveals one or more outstanding condition affecting the fishing industry. Obviously this is to be expected, as the fisheries are of a most varied nature and the ramifications of the trade extensive. Nineteen twenty-three presented unusual conditions and problems, as can readily be appreciated by the very considerable decrease in the catches of several principal varieties of fish, and in the substantial decrease in the total landed and marketed values.

Extraordinarily severe weather and ice conditions prevailed during the first four months. The coast was hemmed in by extensive ice-fields, preventing the launching of small boats, thus causing continued suspension of the operations of the inshore fishermen, except comparatively small and desultory efforts in several of the more favourably located districts. If it had not been for the steam trawler fleet the valuable fresh and smoked fish trade that has been developed the past ten years would have been badly demoralized, as the demands of the markets would have had to be met by shipments from the United States. The trawler fleet was the only dependable source of supply, and while experiencing exceptional operating difficulties continued to land fair catches during the four months.

The above noted unfavourable conditions were greatly aggravated by the American tariff, resulting in general discontent on the part of the fishermen, as the buyers were unable to sustain or increase the prices for the catches. The high cost of operations, together with the low prices for the catches, resulted in a large number of fishermen abandoning the industry for other means of employment, or leaving the province for the time being.

While the above brief review may not be particularly heartening, due to abnormal conditions obtaining which were beyond the control of the Canadian authorities, there has been the saving element of a settled determination to hold fast to the industry for the better times that are bound to come as normal conditions return.

It is gratifying to report that the fresh fish trade, and also the trade in smoked fish, particularly finnan haddies and fillets, withstood the shock of the American tariff, and, indeed, was increased as the efforts of the dealers to extend the Canadian trade met with signal success.

In addition to the general expansion of the Canadian trade, successful experiments were made to gain markets at points hitherto looked upon as too remote to be considered. For instance, smoked shipments were made to Denver, Colorado. The shipments arrived in excellent condition and resulted in a repeat order by wire. A shipments of 4,000 boxes of specially processed smoked fish to Cape Town, South Africa, also arrived in good condition, with the probability that a permanent trade may be developed with that distant country.

The lobster fishery of the western district opened March 1, under heavy disabilities, as the ice was piled in heaps along the shore, making impossible any operations of a remunerative character. The total catch for March and April was only 12,511 cwts., valued at \$278,437, as compared with 26,266

cwts., and \$496,631, the same two months of the previous year. It will be of interest to note that the catch for March and April, 1921, when the fishery was operated under most favourable conditions, was 66,326 cwts.

Happily the abnormal features that obtained during the first four months were greatly relieved, and conditions generally improved until the end of the year. The prospects for 1924 are good, as the available supplies will in all likelihood be absorbed early in the new year.

THE MARKETS

The markets were most unpromising for the greater part of the year. The more distant foreign trade had not recovered from the general depression of the previous years, consequently the adverse exchange made impossible any worth-while resumption of business. In addition, the American tariff gave substantial grounds for believing that the trade in pickled fish would be unremunerative. The duty of \$2 per barrel was considered prohibitive. As a consequence many of the fishermen abandoned the herring fishery. Pickled herring was a drug on the market, selling as low as \$4 per barrel. Also the increased duties on fresh and other fish greatly disturbed the trade and seriously affected the prices paid the fishermen for their catches. It is estimated that over 30 per cent of the fishermen suspended operations; in some districts fully 80 per cent ceased operations for some months.

The alarm, however, was greater than the situation warranted, as the markets improved to a marked degree toward the end of the year, when good quality pickled herring and mackerel were at a premium, while the supply of dried fish had been well absorbed at satisfactory prices, with the prospect that the available stock would be all taken up before the spring catch of 1924 would be ready for the market. It is fairly safe to state that a first class grade of pickled herring will find ready sale at \$10 per barrel, and dried fish at \$9 or \$9.50 per quintal.

The canned lobster trade suffered unusual depression, which involved a number of the dealers in heavy losses. Some 60,000 cases of the total Canadian pack, carried over from 1922, were unsold, and as a consequence of the heavy operations of 1923 it was quite impossible for the markets to absorb the heavy carry-over. At the end of the year about 50,000 cases were in store, with little prospects of being disposed of except at prices below the cost of production. The packers will be under the necessity of reducing the prices to the fishermen the coming year or of reducing the pack by at least one-third. The latter course is improbable, if not indeed quite impracticable, unless action is taken to prohibit the taking of small lobsters in districts favourably located for the trade in live lobsters of export size.

CATCHES AND VALUES

The following is a summary of the catches and values of some of the principal varieties of fish. As a significantly noteworthy arrangement, the lobster fishing and canning industry has the place of honor which it has gained by its actual value to the fishermen and its importance to the export trade as compared with the cod and other fisheries that have hitherto had precedence in the estimation of values. The total landed value of the cod fishery of Nova Scotia for 1923 was \$1,796,770, while the total value of the lobster catch was \$2,239,187. In the table of fish and fish products exported from the whole of Canada for 1922, as compiled by the External Trade Branch of the Dominion Bureau of Statistics, the value of the lobsters exported is shown to be \$6,097,710, while that of cod was \$5,719,627, or \$378,083 in favour of the lobster industry.

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It is quite apparent from the above that the strong and continued agitation for increased protection to the lobster fishery is based on sound economic grounds and should receive the consideration the importance of the industry deserves. It is hoped that definite steps may be taken at an early date for a thorough-going investigation of the conditions at present affecting the fishery.

THE LOBSTER FISHERY

The total lobster catch for 1923 was 172,720 cwts., having a landed value of \$2,239,187, as compared with 173,706 cwts., and \$1,953,848 for 1922.

The total pack for 1923 was 63,971 cases, as compared with 64,552 cases for 1922. The total value of the pack was \$2,040,505 for 1923 as compared with \$2,018,315 for 1922.

The total marketed value for 1923 was \$3,081,647 as compared with \$2,913,087 for 1922.

The following is the catch and pack by counties:—

	Catch		Pack	
	cwts.	\$	cases	\$
Inverness.....	17,366	185,307	8,120	249,943
Victoria.....	8,300	73,731	3,737	139,842
Cape Breton.....	14,602	126,435	7,201	225,032
Richmond.....	6,464	64,346	2,640	77,011
	46,732	449,819	21,698	691,828

Of the above 355 cases of tomalley, valued at \$3,599 are included.

Halifax.....	5,892	84,244	1,346	44,029
Guysboro.....	9,717	103,068	3,414	104,715
Antigonish.....	10,956	117,844	5,473	171,690
Pictou.....	21,575	217,369	11,585	341,073
Colchester.....	918	11,018	459	13,750
Cumberland.....	11,290	120,996	5,507	165,664
	60,348	654,539	27,784	840,921

Included in the above pack are 609 cases of tomalley, valued at \$6,322.

Lunenburg.....	1,552	20,084	267	8,041
Queens.....	2,000	25,369	466	13,995
Shelburne.....	16,242	298,891	3,864	130,823
Yarmouth.....	32,340	520,539	8,382	274,827
Digby.....	12,003	231,571	2,603	91,079
Annapolis.....	1,358	34,750		
Kings.....	145	3,625		
	65,640	1,134,829	15,582	518,765

Included in the above pack are 129 cases of tomalley, valued at \$1,088.

COD AND HADDOCK

The total catch of cod was 1,048,943 cwts., having a landed value of \$1,796,770 and a marketed value of \$2,434,492, as compared with the catch of 1,560,271 cwts., in 1922, having a landed value of \$3,003,056 and a marketed value of \$3,555,637.

The operations of the Lunenburg Grand Banks fleet show that the decrease was largely due to curtailed operations. Eighty vessels only engaged in the fishery during 1923. This is the smallest number for more than twenty years and nineteen less than 1922. The total landings of the fleet were only 194,600 quintals, as compared with 312,075 quintals for 1922. Of this catch 20,550 quintals were taken on the early spring trip, 47,325 in the late spring trip and 126,725 in the summer trip. The average catch per vessel was very good, being 2,432 quintals. The operating expenses of this fishery continue to be heavy since the war, and are out of proportion compared with the prices received for the catches. A fair profit cannot be made at a less price than \$7 per quintal.

The haddock catch was 297,023 cwts., valued at \$486,492, as compared with 298,593 cwts., and \$530,316 in 1922. The marketed value was \$1,029,787.

HERRING

The herring catch was 165,886 cwts., having a marketed value of \$295,391, as compared with 183,138 cwts., and \$364,815 in 1922. For several years past the herring fishery has been neglected, owing to the lack of markets for the pickled product. This trade is gradually decreasing.

MACKEREL

The total catch was only 79,184 cwts., having a landed value of \$245,666 as compared with 166,538 cwts., and \$825,852 the preceding year. The marketed value was only \$388,051 as compared with \$1,129,104 in 1922.

It will be noted that the decrease in the total value of the fisheries of nearly two million dollars is almost altogether made up of the decreases in the values of the cod and mackerel fisheries, cod being responsible for \$1,121,145 and mackerel \$741,053.

The spring run was small in size and erratic in movement, although good catches were taken in Yarmouth county in June. The Inverness run was a failure. The prices were low, the fishermen receiving only one cent per pound for a large portion of their catches. The catches along the New England coast were unusually large, with the result that the American markets were over supplied, consequently it was impossible for shipments to be made from Nova Scotia, as the prices at Boston were less than the cost of barreling, icing, transportation and duty from Halifax or Yarmouth. The situation was made the more difficult as some of the dealers had considerable stocks in storage of the catch of 1922, for which twenty cents apiece had been paid. It would have been to the advantage of our fishermen and dealers to have pickled the large sized fish, as toward the end of the year there was a good demand for this class of goods, at excellent prices.

SALMON

The salmon catch was 11,217 cwts., having a marketed value of \$202,090, as compared with 8,577 cwts., and \$154,771 in 1922.

The following reports by districts will be of interest in showing the local conditions with respect to catches and values:—

DISTRICT No. 1, CAPE BRETON.—Inspector McLeod.

The mackerel and cod were the two deep sea fisheries that suffered from unfavourable conditions; the mackerel run being a failure and the cod prices being so low that many of the fishermen found it unprofitable to operate. Compared with 1922 there were 986 less fishermen, 365 less boats, 1,483 less nets, 3,256 less trawls, and 1,030 less hand-lines engaged in the industry.

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It is encouraging to note the substantial increase, amounting to about \$112,000 in the values of the salmon, swordfish, halibut and squid fisheries.

Lobsters.—The catch of lobsters was 46,732 cwts., valued at \$449,819, as compared with 47,898 cwts., valued at \$363,078, for 1922, showing a decrease in the catch of 1,166 cwts. and an increase of \$86,741 in the value. The marketed value was \$730,981, as compared with \$695,851 for last year, or an increase of \$35,130.

The fishery was prosecuted with the greatest vigour, as it afforded remunerative employment and ready returns at the season of the year when other varieties of fish were in poor demand. High prices prevailed throughout the entire season. The financial returns were over 100 per cent higher than cod, which came next in value. The heaviest landings were at Mainadieu, Port Hood Island, Alder Point and Big Bras d'Or.

Cod.—The catch of cod was 89,071 cwts., having a value of \$120,196, as compared with 135,635 cwts. and \$178,312 for 1922, showing a decrease in the catch of 46,564 cwts. as well as a decrease in the value of \$58,116 as compared with 1922. Marketed value, \$246,790, and for 1922, \$282,172.

The decrease in the catch is due entirely to fewer fishermen having engaged in the industry. The fish were very abundant on all the fishing grounds, especially during the months of July, August, September, October, November and December. The principal landings were a Petit de Grat, Eastern Harbour and North Sydney.

Haddock.—The total landed catch was 58,059 cwts., having a value of \$55,350, as compared with 72,111 cwts. and \$85,773 for 1922, showing a decrease of 14,052 cwts. in the catch and \$30,423 in the value. The marketed value was \$194,117, compared with \$148,691 for 1922, an increase of \$45,426.

The principal landings were at Port Hawkesbury, North and South Ingonish. At North Ingonish a decrease of 11,578 cwts. is shown, due to the suspension of the operations of five trap-nets. At the place during the month of May a great quantity of haddock was liberated from the traps, as the owners would not sell at the low prices offered.

Herring.—The catch of herring was 30,007 cwts., having a value of \$27,147, as compared with 26,132 cwts. valued at \$26,028, for 1922, an increase in the catch of 3,875 cwts., and an increase in the value of \$1,119. The marketed value was \$48,733, as compared with \$45,244 for the preceding year, an increase of \$3,489.

The largest landings were at St. Ann's, Eastern Harbour, Grand Etang and Margaree Harbour. The catches were composed of spring herring almost entirely.

Mackerel.—The catch landed was 18,717 cwts., valued at \$48,809, as compared with 38,372 cwts., valued at \$154,551, for the preceding year, a decrease of 19,665 cwts. in the catch and \$105,742 in the value. The marketed value was \$76,989, as compared with \$198,158 for 1922, a decrease of \$121,169.

The principal landings were at L'Ardoise, Hawkesbury and Petit de Grat. For some unaccountable reason these fish did not appear on the coast of Inverness in as large schools as in previous years. At Eastern Harbour the catch was only 300 cwts., compared with 4,812 cwts. for the previous year. At Margaree Harbour the catch was only 125 cwts., compared with 1,827 for 1922.

Swordfish.—The total catch was 9,364 cwts., valued at \$59,602, compared with 3,409 cwts. with a value of \$42,569 for the preceding year, an increase of 3,409 cwts. in the catch and \$17,033 in the value. The marketed value was \$98,639 compared with \$46,773 for 1922, an increase of \$51,866.

The greatest landings were at Petit de Grat, Louisburg, South Ingonish and North Sydney. These fish were plentiful in the waters surrounding Isle Madame, and also along the coast of L'Ardoise, Gabarus, Louisburg, Mira Bay, Glace Bay and Sydney, but the high wind that prevailed during the time that these fish struck the coast of Ingonish and Neil's Harbour greatly interfered with fishing operations.

Smelts.—The catch of smelts was 2,181 cwts., having a value of \$21,764, as compared with 2,209 cwts., valued at \$22,689, for the preceding year, a decrease of 28 cwts. in the catch and \$925 in the value. The marketed value was \$25,623, as compared with \$23,766 for 1922, an increase of \$1,857.

The decrease in the catch is due to the severe weather that prevailed during January and February, and the extremely mild weather during November and December.

Squid.—The catch was 1,983 bbls. having a value of \$7,108, as compared with 872 barrels, valued at \$1,910 for 1922, an increase of 1,111 barrels and \$5,198. The total marketed value was \$7,136, as compared with \$1,924 for the year previous, an increase of \$5,212.

These fish were exceptionally plentiful along the coast of Inverness from Hawkesbury to Eastern Harbour, and the catches so heavy that the fishermen were obliged to cease operating, the cold storage plants at Hawkesbury being quickly filled to capacity. Great numbers of these fish ran ashore at the headwaters at Sydney Harbour and St. Ann's Harbour.

Salmon (Commercial).—The total landed catch was 3,935 cwts., having a value of \$49,265, as compared with 2,153 cwts., valued at \$24,017, for the preceding year, an increase of 1,782 cwts. in catch and \$25,248 in the value. The marketed value was \$63,386, as compared with \$30,587 for 1922, an increase of \$32,799.

The largest landings were at Margaree Harbour, Grand Etang, Eastern Harbour and St. Ann's. It should also be noted that these fish were of a much larger size than have frequented this coast for the past three or four years.

Salmon (Domestic).—Anglers have had the best season known on the Margaree river, and records were established in quantity and size. One sportsman landed eight salmon on August 20, the largest weighing 36½ pounds. Eleven anglers landed 1,361 salmon during the season. The catch with the fly was 137 cwts., compared with 91 cwts. for the preceding year. It is also very pleasing to note that fifteen salmon were caught in the Middle river, and twelve salmon in North river, St. Ann's, with rod and line, where it was supposed that salmon would not take the fly, as none had been caught previous to this season.

As this island is becoming better known as a Fisherman's Paradise, increased demands are made upon overseers and guardians for closer supervision of our excellent sporting streams. It gives me great pleasure to report that the officers of this district have performed their numerous duties in a most efficient manner and are to be highly commended.

Oysters.—The catch was 2,136 barrels, valued at \$10,302, as compared with 747 barrels, valued at \$4,278 for 1922, an increase of 1,389 barrels in the catch and \$6,024 in the value. Total marketed value was \$12,147, compared with \$4,478 for 1922, an increase of \$7,669.

The increase in the catch is due to oysters being far more plentiful, favourable weather and an increased number of fishermen engaging in the industry. The largest landings were at Orangedale and Washabuck.

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Scallops.—Some were caught on cod trawls in deep water in Inhabitants basin, Richmond county, and some were washed ashore at Money Point, cape Smoky, Aspy bay and cape Dauphin, Victoria county, during the severe storm that raged on October first and second.

DISTRICT No. 2.—Comprising the counties of Halifax, Guysboro, Antigonish, Pictou, Colchester, Cumberland and Hants.—Inspector Sutherland.

There are two distinct classes of fishermen in this district, the one being entirely dependent on the fisheries for a means of livelihood, and the other being composed of farmers who engage in the lobster fishery only. Halifax and Guysboro counties are the chief bone fide fishing districts.

The distinctly fishing districts suffered severely from the depression that has existed since 1920. The farmer-fishermen, however, had a satisfactory season, as the landed value of the lobster catch was the greatest for many years, being \$160,000 in excess of that for the previous year. The fishermen's prosperity, however, was not generally shared by the packers, as the markets for the canned product were greatly overstocked.

The outstanding features of the year's operations were the failure of the mackerel fishery, especially in Halifax county west, and the general increase in the value of the lobster catch.

CATCHES AND VALUES

Lobsters.—The catch was 60,348 cwts., valued at \$654,539, as compared with 63,709 cwts. and \$494,061 in 1922. The noteworthy feature of the fisheries of this district for 1923 was the increase of \$160,478 in the landed value of the lobster catch, while the quantity taken was 3,361 cwts. less than in 1922 notwithstanding the extensions to the regular spring seasons, which accounted for 5,189 cwts. It is interesting to note that the value of the catch to the fishermen in 1923 was \$411,482 greater than the 1921 catch.

Increased catches were taken in Colchester county north (858 cwts.), where two new canneries were operated; Antigonish county (647 cwts.); Guysboro county east (2,039 cwts.); and Halifax county west (1,024 cwts.).

Cod.—The catch of cod was 178,932 cwts., valued at \$308,019, as compared with 180,403 cwts. and \$326,869 in 1922. Of the total catch 97,400 cwts. were taken offshore by vessels and steam trawlers, principally the latter; 60,000 cwts. were landed at Canso and 32,600 cwts. at Halifax, and 10,360 cwts. by vessels landing in Halifax county east.

Practically the total catch was landed in Halifax and Guysboro counties, and there was a general decrease in the catch of inshore boats.

Haddock.—The catch was 159,359 cwts., valued at \$286,390, as compared with 121,950 cwts. and \$234,668 in 1922; 108,750 cwts. of the catch was taken offshore, principally by steam trawlers landing at Halifax and Canso.

Herring.—The catch was 70,527 cwts., valued at \$53,519, as compared with 68,494 cwts., valued at \$67,296, for the previous year. The catch in Cumberland county west, and Antigonish county shows a substantial increase, while smaller catches were landed in Guysboro county and Halifax county east. Owing to especially poor markets the fishermen did not prosecute the fishing with energy. At the end of the year, however, the price of pickled herring was about \$8 per barrel, as the supplies on the market were low. If there had been prospects for such prices, double the quantity of herring would have been packed, especially in Halifax county west.

The total catch for this district was disposed of as follows: Pickled, 6,141 barrels; fresh, 12,825 cwts.; smoked, 12,256 cwts.; and for bait, 7,778 barrels.

Mackerel.—The mackerel catch was 34,628 cwts., having a value of \$89,093, as compared with 75,095 cwts., valued at \$342,624, in 1922. The greatest loss of the year was in the mackerel fishery of Halifax county west, where the catch fell off 32,261 cwts., with a loss to the fishermen of \$178,159. The catch in Halifax county east showed an increase. The heavy run of fish came late in May when the prices offered were only about .02½ cents per fish, which did not pay the fishermen to operate. In Guysboro county, mackerel also fell off so that the season throughout this district was a decided failure, although the quantity taken compares favourably with an average season. The home market can absorb only a small part of the catch, and high transportation and tariff make the American market almost prohibitive. Consequently the mackerel fishermen look for little relief until these matters are remedied. The average price offered was .02½ cents per pound.

Unlike 1922, spring mackerel did not trim the shores of Halifax county west and were therefore beyond the reach of seine and trap-net fishermen. Fall mackerel were only taken in Guysboro county east and Halifax county west. Prices during the fall season were somewhat better, about .05 to .06 cents per pound. The salted mackerel market was brisk during the last month of the year.

Albacore.—The catch was 2,098 cwts., having a value of \$4,469, as compared with 1,029 cwts. in 1922, valued at \$1,938. The increase in this fishery is due to the fact that albacore were scarce on the American coast during the early part of the season and prices on the Boston market were good. When the price is small the proceeds of sale do not cover duty and transportation charges.

Shad.—The catch was 878 cwts., valued at \$9,520, as compared with 485 cwts. in 1922, having a value of \$6,487. The catch of shad was the best since 1917. The two weeks extension to the regular season accounts for 244 cwts. Large numbers of small shad are reported by the fishermen, which would indicate that the three years' close season was of some benefit to the fishery. Practically the total catch was taken in Cobequid bay and Cumberland basin. About 100 barrels were salted and sold for \$30 per barrel, the remainder being sold fresh at \$10 per cwt.

Salmon.—The catch was 5,109 cwts., valued at \$65,865, as compared with 4,587 cwts. and \$58,605 in 1922. A further increase is noted in the salmon catch of 522 cwts., but the two weeks extension to the regular season in Pictou and Antigonish counties and bay of Fundy accounts for 206 cwts. Since 1920 the catch has increased about 200 per cent in this district, and is as follows:—1920, 1,717 cwts.; 1921, 3,192 cwts.; 1922, 4,587 cwts.; 1923, 5,019 cwts. The catch for 1923 is the highest since 1913.

Oysters.—The catch was 629 barrels valued at \$4,451, as compared with 717 barrels with a value of \$5,214 for the preceding year. The oyster catch shows a further decrease of 88 barrels. This fishery has gradually decreased from 2,000 barrels in 1912 to its present condition.

DISTRICT No. 3.—Comprising the counties of Lunenburg, Queens, Shelburne, Yarmouth, Digby, Annapolis and Kings.—Inspector Marshall.

The conditions in this district were similar to those obtaining generally along the whole coast. There was a decrease in all kinds of vessels and in the

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number of men operating. There were twenty-five less vessels of 40 tons and over, and about one thousand less fishermen engaged in carrying on the work as compared with 1922.

The lobster catch exceeded that of the previous year both in quantity taken and in value. There was also an increase in the quantity and value of the scallop catch.

Lobsters.—The catch of lobsters was 65,640 cwts., with a value of \$1,134,829, as compared with 62,099 cwts., with a value of \$1,096,709, for the season 1922, an increase of 3,541 cwts., with a value of \$38,120.

The lobster catch shows a slight increase both in catch and value over the previous year, which increase is accounted for by the extension given covering the month of June, 1923.

The quantity shipped alive from the western district during the past season was 29,777 cwts., valued at \$734,116. Of this quantity 17,772 cwts., valued at \$421,689, were shipped to the American markets via Yarmouth, and 12,005 cwts., valued at \$312,427, shipped by well smacks.

Cod.—The total catch was 780,940 cwts., having a value of \$1,368,555, as compared with 1,244,233 cwts., with a value of \$2,497,875, for the previous year, showing a decrease in the catch of 463,293 cwts., valued at \$1,129,320.

Haddock.—The catch was 79,605 cwts., having a value of \$144,752, as compared with 104,532 cwts., with a value of \$209,875, for the previous year, a decrease of 24,927 cwts., with a value of \$65,123.

Herring.—The catch was 65,352 cwts., having a value of \$70,513, as compared with 88,512 cwts., having a value of \$94,357 for 1922, a decrease of 23,160 cwts., valued at \$23,844.

Mackerel.—The catch shows a decrease in the quantity and a marked decrease in the value. The catch landed was 25,839 cwts., valued at \$107,764, as compared with 53,071 cwts., valued at \$328,677, for 1922, a decrease of 27,232 cwts., and a decrease in value of \$220,913.

Halibut.—The catch was 8,772 cwts., valued at \$128,806, as compared with the catch for 1922 of 17,214 cwts., valued at \$214,361, a decrease of 8,442 cwts., valued at \$85,555.

Pollock.—The catch of pollock was 24,688 cwts., valued at \$22,538, as compared with the catch for 1922 of 47,416 cwts., valued at \$44,282, a decrease of 22,728 cwts., valued at \$21,744.

Hake and Cusk.—The catch shows a marked decrease, being only 49,651 cwts., valued at \$45,842, as compared with 142,767 cwts., valued at \$114,364, for 1922, a decrease of 93,116 cwts., valued at \$68,522.

Salmon.—The catch was 2,173 cwts., valued at \$49,925, as compared with 1,837 cwts., with a value of \$46,310, for 1922, an increase of 336 cwts., with an increase in value of \$3,615. There has been a marked increase in this fishery for the past three years, this being about a \$16,000 increase in value over the year 1921.

I find the total quantity of salmon taken in tidal waters with nets and weirs is 1,977 cwts., with a value of \$46,559, and 196 cwts., valued at \$3,366, taken in our rivers with rod and fly.

Scallops.—The catch shows 11,839 barrels taken, with a value of \$68,337, as compared with 10,682 barrels, with a value of \$49,678 for 1922, an increase of 1,157 barrels, with a value of \$18,659. Of this catch 7,577 barrels having a value of \$43,714 were taken in the Bay of Fundy and 4,262 barrels, having a value of \$24,623 in the county of Lunenburg. The above shows a steady

increase in the scallop fishery in the bay of Fundy, and there is no doubt but that it will continue to increase each year, as more fishermen fit out to carry on scallop fishing operations.

LICENSES ISSUED—NOVA SCOTIA

Lobster pound.....	4	Salmon gill-net.....	438
“ packing.....	166	“ trap-net.....	335
“ “ -exten.....	111	Smelt gill-net.....	532
“ fishing.....	8,823	“ bag-net.....	210
Weir licenses.....	93	Salmon permits.....	13
Fish cannery.....	15	Trap-nets.....	365
Anglers permits.....	417	Seine.....	181
Oyster fishery.....	179	Shad gill-net.....	6
Scallop fishery.....	298		

RIVER AND INLAND FISHERIES

The importance of preserving the smelt, alewife, shad, salmon and trout fisheries is obvious, the commercial salmon catch alone having a value of over \$200,000, and smelts \$120,000. The continuance and development of these fisheries is dependent on the free and safe access of the parent fish to the spawning grounds of the rivers and headwaters. A very decided improvement in this regard has taken place the past few years. Pollution of the waters from mill refuse and other detrimental deposits have almost entirely ceased. The conditions in this respect as compared with those obtaining some ten or more years ago are marked. The operators of the saw-mills and paper mills on the more important rivers and streams have co-operated in every reasonable effort to prevent pollution of the waters. Obstructions to the free ascent of fish have been removed from many of the principal streams. The character of the artificial fishways constructed are a very great improvement on former types.

In addition to the more vigorous general efforts a number of the principal streams have received special attention, such as the Margaree, the Medway, St. Mary's and the Mersey. The fishways on the latter river have been thoroughly repaired or reconstructed during the past year. The heavy volume of water flowing down this river has made the task of improvement a most difficult one. It is confidently expected that the improvements will greatly enhance the value of the fishery.

The commercial or coastal salmon fishery is increasing in volume and value, due to the improved conditions noted above.

The relation between the prosperity of the salmon fishery and the development of the tourist trade is very close. It is quite essential that the sport-loving tourist be given every facility and encouragement. Nova Scotia should become a popular and prosperous sport fishing district. The salmon sport fishermen comprise a fraternity of the best and most desirable class of tourist, and every effort to improve attractive conditions is fully warranted. The recently organized Tourist Association and kindred bodies are alive to the possibilities in this regard, and are working in close co-operation with the officials of the Fisheries service.

It is not forgotten, however, that while the salmon sport fishery is receiving first attention, the great percentage of visitors to the province are more interested in trout fishing. It is safe to say that for every ten salmon fishermen there are ninety trout fishermen. This is true not only with respect to visiting anglers, but is particularly true with respect to our own native sport fishermen.

Every effort made to improve salmon fishery conditions affects equally the trout fishery, which continues to be in a prosperous condition notwithstanding the constant heavy whipping of the streams each year.

Systematic investigation of the inland waters is now in hand, in order to ascertain the conditions governing successful propagation, as the Fish Culture

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Branch of the department has in hand increased efforts to restock our waters with both salmon and trout.

During the past year more than ten million salmon and trout fry were deposited in the inland waters of the province.

INCREASED COLD STORAGE ACCOMMODATION

The construction of a new plant at North Sydney for the Cape Breton Cold Storage Company will be completed early in the new year. This plant is of a most modern description and well designed for both the fresh and smoked fish trade. The operations will be under the management of Mr. R. T. Matthews, who has had large experience in the business.

Arrangements have already been made to market the product of the plant, which is expected to speedily reach a maximum, as the prolific fisheries of the district north to Ingonish are easily available for supplies. It is also expected that the operations of the plant will develop the fishing fleet along a considerable portion of the coast.

The Yarmouth plant will probably be completed and ready for business about the middle of the year. This plant is well located, particularly for the American trade. It is hoped that a large Canadian trade may be developed by a favourable commodity rate over the Canadian National Railway on shipments for storage and transshipment. This plant will be of great advantage to the industry of the southwestern shore, as fresh fish shipments for Boston and other American centres can be held in storage at Yarmouth, for quick delivery when the markets are favourable.

FISHERY PROTECTION SERVICE

The number of boats in this service has been gradually reduced until at present only four are operated, namely the steamers *Arras* and *Arleux* and the gasoline boats *Mildred McColl* and *A*.

The *Arleux*, under command of Capt. Milne, and the *Arras*, Captain Barkhouse, rendered most excellent and valuable service in the protection of the territorial waters, assisting disabled fishing vessels; light ice-breaking to facilitate the movements of the fishing fleet, and in acting as "mother ships" to the winter fishing fleets of small boats operating off Canso and Lockeport. The services performed the past year were greatly appreciated by the fishermen, and assisted to a large degree in encouraging the fishermen to continue the operations during the winter months. With the aid of these ships the catches were greatly increased, and as a consequence the fishermen and the trade generally were directly benefited.

During July and August the *Arras* was in service with the Grand Banks fleet. The satisfaction given was so evident that she will probably be engaged in like service the coming summer.

With special reference to the coastal duties the Captain reports:—

During the year we had sixty-eight American fishing vessels on our station, which we boarded and examined 188 times.

We had fourteen American swordfishing vessels in our waters and seventy-six Canadian swordfishing vessels. These vessels made headquarters at Louisburg during the swordfishing season and some very large catches were made.

With the *Arras* in close touch with the winter fishing fleet out of Lockeport, to assist them in stormy weather, the catch of fish was above the average.

During the year we steamed 13,492 miles, and were at sea 1,634 hours, and consumed 1,092 tons of coal.

The *Arleux* was engaged during August and September in special tidal and survey work off the Labrador straits of Belle Isle district.

The gasoline patrol boat *A*, carrying a crew of four, covers the Western Nova Scotia district, where formerly three boats of a type similar to the *A* were employed, and performed essential service in protecting the lobster and other fisheries of the district, and in assisting the shore officers in the performance of their duties.

The gasoline patrol boat *Mildred McColl*, carrying a crew of four men, covers the large and important district from Lunenburg to Canso, and the Straits district. This boat was in commission from April 3 to January 17, and during the summer months until October 15 was engaged in lobster and salmon protection in Pictou, Colchester, Cumberland and Antigonish counties, where most effective work was performed, especially in Cumberland county west, on the lobster boundary between the spring and fall seasons. After October 15 the boat proceeded to Halifax and Guysboro counties and was engaged in general protection work until the lobster fishing season opened December 1 in Halifax county west. The boat then patrolled the open and closed districts in Halifax county west and Lunenburg county east until she was laid up about the middle of January.

Any successful administration or oversight of the coastal fisheries is due very largely to the facilities afforded by these two gasoline boats, as the work required to be done is in connection with the inshore trap-net, gill-net and lobster fisheries, and along portions of the coast where it would be impossible to employ either the *Arras* or *Arleux*, even if such boats were available when needed.

REPORT OF INSPECTOR J. F. CALDER, DISTRICT No. 1, PROVINCE OF NEW BRUNSWICK, FOR 1923

This district comprises the counties of Charlotte, St. John, Albert and the Bay of Fundy watershed of Westmorland county.

The value of the yield of the fisheries of this district during the present year, was slightly less than that of the previous year. The value of the catch in a fresh condition for the present year, is as follows: Charlotte county, \$709,431; St. John county, \$153,620; Bay of Fundy watershed of Westmorland county, \$4,891 and \$289 for Albert county; making a total of \$868,231, against \$877,845 for 1922.

The value of the products marketed by the fishermen are as follows: Charlotte county, \$598,503; St. John county, \$81,310; Bay of Fundy watershed of Westmorland county, \$4,891; Albert county, \$289; making a total of \$684,992. The fish dealers marketed products to the value of \$685,617, making a total in all of \$1,663,970, against \$1,639,651 for 1922.

COD

Twenty-one thousand six hundred and one cwts. of cod were taken this year with a marketed value of \$47,310, against 41,435 cwts. for 1922, with a market value of \$87,317. Practically all these fish were taken on the in-shore fishing grounds. The catch for 1922 was exceptionally large for the district while this year's catch was away below the average. One reason why the catch was so small during the present year, is that owing to the severity of the winter, practically no fishing was done at all until late in the spring. On the other hand, the weather during the previous winter was comparatively mild, with the result that good catches of cod were made.

The principal places where quantities of cod are landed are Chance Harbour and Dipper Harbour in St. John county; Beaver Harbour, Wilson's Beach and Grand Manan in Charlotte county.

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HADDOCK

Four thousand nine hundred and seventy-four cwts. of haddock, with a marketed value of \$11,139, were taken this year, while 2,790 cwts. with a marketed value of \$8,343, were taken in 1922. I have pointed out in previous reports that the catch of haddock was becoming less each year; these reports were in accordance with the facts existing at the time they were made out. I am pleased to report, however, that haddock have been more plentiful during the present year than for any season during the past fifteen years.

HAKE

Only 17,912 cwts. of hake, with a marketed value of \$18,981, were taken during the present year, as compared with 93,503 cwts. in 1922, valued at \$116,451. This extraordinary decline in the catch is due altogether to the fact that there was very little opportunity for the fishermen to dispose of hake in any part of the district, as the market was glutted with stocks that were kept over from the previous year; a few buyers did take some at Beaver Harbour and Wilson's Beach. At North Head, Grand Manan, which heretofore has been one of the chief centres of the hake fishery, the dealers carried over from the previous year practically all they had bought. As a result of this, they did not buy and during the present year, consequently, the fishermen did not operate.

POLLOCK

A very small catch of pollock was made during the present year, 28,841 cwts. with a marketed value of \$40,351 against 77,158 cwts. with a marketed value of \$88,633 for the previous year. The large decline in the catch of pollock is due to a scarcity of the fish, for there was a fair market for these fish during all the season. The summer run of pollock was very light, but the fishermen were buoyed up with the hope that when squid made their appearance, which is usually during the first part of August, a good fall run would come in. Unfortunately, they were doomed to disappointment. The run of squid was practically nil, with the result that the fall run of pollock did not put in an appearance. The failure of the pollock fishery was a hard blow to the line fishermen of Campobello, Deer Island and Grand Manan. The failure of the squid to appear is attributed generally by the fishermen, to the unprecedented severe winter of 1923. The winter was so cold and the spring so backward that the ice did not leave our waters until a month or six weeks later than it generally does. I have no doubt that the prolonged low temperature of the water was very destructive to the young fishes, particularly so in the case of the food of the fishes.

HERRING

The smoked herring business at Grand Manan was a failure during the present year, as very few herring, suitable for smoking purposes, were taken in the weirs. The few that were taken were mostly sold in a fresh condition for high prices to the smoke houses at Lubec, Maine. Large herring were reported from time to time as being quite plentiful in the waters outside of Grand Manan Island, but very few reached the weirs. This is generally attributed to the fact that the natural enemies of the herring, the squid, silver-hake and dog-fish—did not put in an appearance, with the result that the herring did not reach the inshore grounds. The scarcity of herring on the inshore grounds was not confined to this district, by any means. The same situation occurred along the coasts of the state of Maine, and also on the Nova Scotia shore of the bay of Fundy all the way down to cape Sable, and even beyond there. As a result

of this scarcity of herring in Nova Scotia, many vessels came from there to this district, particularly Grand Manan, to buy lobster bait. Of course, as herring were scarce here, the available supply for bait was limited. However, nearly 6,000 barrels were taken away for that purpose. The Nova Scotia lobster fishermen would certainly have been in a very bad way if it had not been for the supply of bait they procured from our weirs.

SARDINES

The catch of sardine herring was very small. 134,494 barrels only were taken, against 244,553 barrels for the previous year. But while the catch for the previous year brought \$296,864, the yield for this year netted the fishermen \$395,968.

Owing to the extreme scarcity of sardine herring the combination, which has for a number of years existed among the canners, in so far as buying their supply of fish is concerned, was broken. During most of the fall months there was very active competition among the canners in purchasing herring from the weirs. As a result of this, our fishermen, for the first time since 1918, got a fair price for their catch.

SALMON

There is very little to note in connection with the salmon fishery of the district during the present year. The catch by the commercial fishermen was just slightly less than during the previous year—2,658 cwts. for 1923 against 2,738 cwts. for 1922.

CLAMS

Very little of interest is to be noted in connection with the clam fishery during the present year. 13,057 barrels were taken this year against 12,435 barrels during the previous year. The fishermen, however, received slightly better prices for the yield during the present year.

LOBSTERS

There was a considerable falling off in the lobster fishery for the present year. The catch was 5,813 cwts., against 7,178 cwts. for the previous year. Good prices were obtained for the yield, and most of the fishermen who were engaged in this branch did fairly well while they were at it.

While the present year has been rather a poor one for the fisheries of the district, there are many circumstances which point to a return of good times in the fishing industry. Generally speaking, a good supply of the different kinds of fish is always available, in their respective seasons, but for the past few years the fishermen have been held down by lack of market for their products. The breaking up of the combine of the sardine canners means much to our fishermen, as the sardine fishery is the most valuable one we have. It could not have been much longer continued, with such prices as were paid during the four previous years. Then again, the old stocks of line fish are being got rid of, and 1924 finds us with very little old stocks on hand. It looks as if there would be a good demand for all kinds of fish during the coming year. If these expectations are realized, a large increase in the catch may be confidently looked forward to.

PATROL BOAT "PHALAROPE"

Patrol boat *Phalarope*, Captain Kelly, went in commission on April 1, and was on duty until February 15. The boat was principally engaged up to the end of the open season for lobster fishing, during the spring season, in having

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the size limits for lobsters in the different counties observed. During the close season for lobster fishing, the services of this boat were valuable in preventing illegal fishing; all traps found set during the close season were confiscated and destroyed forthwith.

Owing to the high prices being paid for sardine herring, repeated attempts were made to violate the herring fishery regulations in many places in Charlotte County by the use of drag-seines and also by "driving." The *Phalarope* did good work in suppressing and breaking up such practices, especially at Deer Island.

The *Phalarope* covered about 6,166 miles during the season.

PATROL BOATS "TOGO" AND "SHANNON"

The patrol boat *Togo* was used from April 1 until October 31. On November 1, the *Togo* was returned to her owner, and the *Shannon* was hired. The *Togo* was a very good boat, but the engine in her was not satisfactory and we were therefore compelled to procure another boat. The *Shannon* has a splendid engine, and is a very satisfactory boat for the service. Captain Joy was in command, and has proven to be a very energetic and efficient officer.

The chief work of this boat is the enforcement of the lobster fishery regulations. Owing to the great extent of the lobster fishing grounds off the main island of Grand Manan and the islands and ledges adjacent thereto, coupled with the fact that the United States market for small lobsters is so close at hand, the duties of this officer are by no means easy. However, Captain Joy is doing everything that he possibly can towards having the regulations observed. I feel sure that the present service is an improvement over any previous service.

During the winter there has been a considerable amount of "driving" for herring around the upper part of Grand Manan island, and Captain Joy is devoting practically all his time in an effort to break up this business.

STATEMENT SHOWING LICENSES ISSUED IN DISTRICT NO. 1

Lobster fisherman's.....	653
Fish cannery.....	6
Salmon fishery.....	77
Shad gill-net or drift-net.....	46
Scallop fishery.....	23
Herring Weir.....	552
Permits to dig soft-shell or long-neck clams.....	120
Special lobster pound.....	5
Lobster pound certificates.....	239
Lease of dark harbour.....	1
Total.....	1,722

REPORT OF INSPECTOR R. CROCKER, DISTRICT No. 2, NEW BRUNSWICK, FOR 1923

District No. 2 comprises the counties of Restigouche, Gloucester, Northumberland, Kent, and the strait side of Westmorland county.

The returns show the value of fish taken to be \$1,922,423 as against \$1,803,695 for the previous year, an increase of \$118,728, showing a very gratifying improvement in the operations over the preceding two years.

COD FISHING

This is a decrease over the previous year of some 5,307 cwts. of which 19,850 cwts. belonging to the district of Overseer Landry and is accounted for because of the fact that during the first of October a very heavy storm pre-

vailed, causing a number of fishing vessels to come ashore. This being late in the season the fishermen did not take the trouble to launch their vessels again. Another factor which interfered perhaps with the cod fishing was that wages in the lumber woods were very good and many of the men left fishing early for the purpose of proceeding to the lumber woods. Doubtless thousands of dollars were lost to the fishermen because after this storm of the first of October unusually good weather prevailed for fall fishing.

MACKEREL

This fishery shows a large decrease, the 1922 catch being 23,441 cwts., while this year's catch was 13,455 cwts., with a corresponding marketed value of \$54,054. The decrease in this was accounted for partly by the fact that there was a smaller run of mackerel on this coast, but more particularly to the fact that the price paid to the fishermen was less than the previous year. During the fall of this year very good catches of mackerel were taken on the United States coast, and these catches affect the selling of the frozen mackerel from our district.

ALEWIVES

This fishery also shows a decrease in quantity taken, which is accounted for by the poor demand for salted alewives. Greater quantities could have been taken had there been any prospect of a market as for some days the fishermen emptied their nets allowing the fish to go. A considerable quantity of pickled fish are carried over into 1924 and will doubtless effect the operations of this fishery for the season of 1924.

SALMON

There was an increase in the catch of 3,972 cwts. over the previous year, but the average price to the fishermen in 1922 was \$11.96 per cwt., while this year the average price was \$9.48. This fishery also, so far as the shipments to the United States points are concerned, has to meet a duty of 2 cents per pound, which if added to this year's price would bring the price per cwt. to the fishermen nearly equal to that of 1922.

SMELTS

This fishery shows a decrease in quantity of 19,578 cwts. as compared with the previous year, but shows an increase in value of \$21,211. The prevailing price for smelts during the earlier part of the year was exceedingly high and during December they also ran quite high. I am of the opinion that the prices prevailing for this year are perhaps the highest in the history of the fishery, the average price for 1923 being 11 cents per pound, while that of 1922 was 7.21 cents per pound.

LOBSTERS

The catch shows an increase of 5,499 cwts. The early season showed an increase in every district, excepting that of Miscou and Shippegan islands, and a small section of Overseer Arsenault's district at Green point. The outlook at the beginning of the season for canned lobsters was very good but as the season went on prices dropped materially and went as low as \$18 per case, as compared with \$26 at the opening of the season. During the late season, in view of the fact that the price of canned lobsters had fallen off to such an extent, a much larger quantity of lobsters were shipped alive to the United

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States markets. Unless a prohibitive duty is put on by the United States doubtless we will see a greater quantity of lobsters shipped alive as years go on. The shippers have given the matter considerable study and are now much better prepared to take care of them and pack them so that they will arrive in good condition in United States markets. The prices prevailing to the fishermen were very well maintained throughout the whole season.

OYSTERS

This fishery shows a large increase as compared with 1922, 14,574 barrels, value \$67,123, as compared with 10,708 barrels, value \$53,447, for the year 1922. During the fishing season the weather was exceptionally fine, thus enabling the fishermen to go on the beds practically every day. A fairly ready market was found with good prices prevailing to the fishermen.

SHAD

This fishery shows an increase of about six and one-half times that of the previous year, 1,394 cwt. for 1923 as compared with 202 cwt. for 1922. Fishermen report that they have never seen shad so plentiful for many years.

Reviewing the whole year's operations I submit they have been very satisfactory. Losses occurred to the fishermen, particularly to the lobster fishermen, during the storm of October 1. The storm was very heavy in the vicinity of Point du Chene, doing considerable damage to the wharves and buildings situated on the wharves. One firm estimates their loss at \$15,000.

At Richibucto, I am pleased to report that a new freezer 150 feet by 40 feet with a correspondingly large ice house of 60 feet by 80 feet has been erected during the latter part of the year by the Messrs. A. and R. Loggie Company, Limited. Since the disastrous fire of 1921 this town has been without an up-to-date freezer and it is very encouraging that this firm have sufficient faith in the business to re-establish at this point.

During the year patrol "C" did some prospecting with a view to ascertaining to what extent scallops could be procured in the waters surrounding Shippegan and Miscou islands and in the Caraquet district. In the latter district the evidence produced was very satisfactory, and in discussing the matter with one of the fish merchants at Caraquet during the latter part of the year he felt that the prospects as shown by the work of the patrol "C" justifies an entrance into the business and purposes, during the season of 1924, to carry on the fishing. It is the intention to have the overseer do more prospecting in this district, and if the evidence procured corresponds with that procured by patrol "C" I would hope to see some important developments in this fishery.

REPORT OF INSPECTOR H. E. HARRISON, INLAND FISHERIES OF
NEW BRUNSWICK FOR 1923

The Inland District of New Brunswick comprises the counties of Kings' Queens, Sunbury, York, Carleton, Victoria and Madawaska.

The winter fisheries of this district do not amount to a great deal, even under favourable conditions, and the first three months of 1923 were exceedingly unfavourable for the few fishermen who attempted to follow winter fishing, an excessive amount of snow and bitterly cold weather prevailing during that time.

ALEWIVES

	Cwt.	Value caught	Value marketed
1922.....	998	\$ 2,495	\$ 2,933
1923.....	875	2,188	2,188

The earliest spring fishing, after the rivers and lakes become free of ice, is the alewife fishery, formerly carried on very extensively by professional fishermen and farmers in all of the waters of the St. John river system between St. John and Fredericton, and, to some extent in the St. John river well up to the Grand falls by farmers mostly who could spare the time, or had sufficient help in their homes to spend two or three weeks operating alewife nets and shipping the fish to St. John. A very great change has taken place during recent years and the spring runs of alewives during recent years have not been good.

BASS		
	Cwts.	Value
1922.....	6	\$ 90
1923.....	17	255

The sea-bass fishery is of little importance, with the exception of two or three years together, long periods apart. For some reason or other these periods do occur, and large quantities of sea bass are taken in some of the lower tributaries of the St. John river, more particularly in Belleisle bay, Kings county. A considerable number of very large sea bass ascend the St. John river to a distance of one hundred miles north of St. John harbour during the summer, and an occasional one is taken in the salmon nets along the river, but no one is permitted to have nets set for them during that time.

PICKEREL		
	Cwt.	Value
1922.....	242	\$ 2,420
1923.....	1,635	16,350

A very remarkable showing is made in this fishery for 1923—nearly 700 per cent increase over that of 1922. I am unable to give any specific reason for this condition, other than that pickerel appeared to be much more plentiful.

SALMON		
	Cwt.	Value
1922.....	424	\$ 9,752
1923.....	355	8,165

Compared with 1922, the salmon fishery shows a decreased catch of 69 cwt., and the catch of 1922 showed a decrease of 151 cwt. compared with the 1921 catch, but the 1922 and the 1920 catches were practically the same. Regarding the 1923 catch, I was not at all surprised that the catch was not larger, having kept fairly well in touch with conditions throughout the season, and I was rather surprised to find that that amount had been taken during the fishing season. In the spring of 1923 we had one of the greatest spring floods known in the history of the St. John river valley, consequently, the salmon fishery particularly on the lower part of the river, was not good during the early part of the season. Then, because of an almost rainless season, the river ran very low and this again affected the lower St. John more than the upper parts. As is generally known, all salmon fishery nets—both tidal and non-tidal—in these waters are set from the shores, or banks, of the river and they extend out a very short distance, while much of the river is very wide, consequently, when the water is low salmon keep to the deeper parts and escape the nets to a great extent. Kings and York counties are the two large salmon producing sub-districts, but the York county district was not so materially affected.

It is unhesitatingly conceded by men whose work is on the water that there are far more salmon in the St. John river during recent years than there were twenty-five or thirty years ago.

SHAD		
	Cwt.	Value
1922.....	1,224	\$ 7,344
1923.....	792	4,752

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The only anxiety I have regarding the fisheries of this district is in connection with this fishery. Notwithstanding the fact that the matter of our supply of shad, and the future of the fishery, were given very serious consideration during the time that the general fishery regulations were under consideration (1921), and the further fact that the 1922 regulations curtailed to a very large extent the operations of the fishermen, the fishery appears to be on a decline again, unfortunately, as the shad is one of our finest fishes.

STURGEON

	Cwt.	Value
1922.....	111	\$ 2,442
1923.....	100	2,000

While the sturgeon fishery is not productive of a large amount in hundred weights, it is at present the fourth in value in this district. This is because of the apparent high appreciation of the flesh of this fish on the New York market. The 1923 season was about an average one. While a large proportion of sturgeon taken were comparatively small fish—40 to 50 pounds weight each—some very large fish were taken.

The total marketed value of the commercial fish in this district during the last two years is as follows:—

Year	Value
1922.....	\$ 25,356
1923.....	33,924

MATERIALS

	Value
1922.....	\$ 21,644
1923.....	16,845

DOMESTIC FISHERIES

	Cwts.	Value
1922.....	467	\$ 8,819
1923.....	426	7,325

There was a considerable decrease in the quantity of salmon taken by anglers, compared with the amount so taken during 1922. Anglers on the St. John, Tobique, and part of the Southwest Miramichi rivers had a very satisfactory season, but the upper waters of the latter river, in Carleton county, fell off very badly from 116 cwts. in 1922 to 24 cwts. in 1923.

This condition was, to a considerable extent, caused by the unfavourable water conditions. After the spring freshet the weather was dry and warm and the upper waters of the Miramichi river evaporated and ran off until it was difficult to run even a light log canoe in many places, and this lasted for several weeks, consequently, salmon found it difficult to reach the upper spawning areas of this water, and very large numbers did not do so, but remained in the deeper water and spawned some twenty or more miles below.

The regulations (authorized in 1922) allowing limited net fishing in a goodly portion of the Miramichi river were very well observed during that season, and, in addition, there was a very heavy freshet in that district during the latter part of June and early July, 1922, so that all obstructions were removed and tens of thousands of salmon and grilse found no difficulties obstructing their way to the upper water of the river, and the result was very excellent angling during 1922.

The Tobique river did not produce quite as much salmon in 1923 as it did in 1922. So far as I can gather, this was not because of weakness in the protective service on either the St. John or Tobique rivers. The riparian owners, and the lessees of the fishing waters of the Tobique river advise me that there

were sufficient numbers of salmon in the river, and that from early summer, but the water was low and the weather was bright and warm during much of the season, and fish simply would not rise to the fly.

The experience of salmon anglers in the vicinity of this place (Fredericton) was very remarkable during 1923. At a pool in the St. John river, within five miles of my office, over four hundred salmon and grilse were taken by anglers during the season, as compared with less than one hundred in 1922. The water was fairly low during a good portion of the season, as it was in 1922, and the fish appeared to stop at this place to be captured. The guardian who was stationed at this place during the summer of 1923 deserves praise for his efficiency and faithfulness in preventing illegal net fishermen operating.

Reports submitted by the sub-district officers covering their several districts indicate a slight betterment in the trout fishing, compared with the previous season. The factor of weather and water conditions enter into this class of sport fishing as well as that of salmon fishing by anglers, so that it is difficult to compare one year with another. I tried to keep in touch with conditions during the season, and reports coming to me were that trout fishing was excellent in some streams and lakes, and not good at other places.

SEARCHING FOR PARENT TROUT WATERS

Some efforts were made by my officers and myself during the season to locate areas where parent trout gather to plant their spawn, in accordance with instructions from the department. While no very great success attended our efforts, I think we got some information that, if followed up, may be of value.

On one section of the Miramichi river and a tributary, one very likely place was located and a few fairly large trout (16-inch fish) were taken. We ate these fish, but when dressing them we found that a large percentage were barren, containing neither eggs nor milt. These were sea trout and well up the Miramichi river.

SUB-DISTRICT OFFICERS

The sub-district officers in my district have been diligent, and have done all in their power to prevent infractions of the fishery laws, and have had a good degree of success, I am sure, and, notwithstanding the goodly quantities of fish taken from these waters—both harbour and inland—with the exception of the shad fishery, which I am anxious over, the fisheries generally are holding their own, and in some instances more than holding their own.

The matter of the pollution of the waters in this district is not now a serious matter. Time was when conditions were anything but good. The matter of the mill men using the rivers, lakes and streams as a means of getting rid of the waste from their mills was a practice of long standing, in fact, from the time of the earliest settlement of the lands, and continued so for a number of years after my appointment, but by a gradual process of education matters were considerably mended, and when the reorganization was completed in 1918 the newly selected local officers found a fairly good foundation laid, and with their assistance we went to work in a united manner and at the present time every man operating a mill knows just what to expect if he attempts to revert to the former method of disposing of his mill waste, and I assure you he is not disappointed in his expectations when it is possible for us to secure any evidence of the infraction. He would very quickly revert to the old method if it were not for the constant watchfulness on the part of the overseers. During 1923 there were fourteen evidences of infractions of this regulation, out of hundreds of mills in my district, and fourteen prosecutions followed, mostly for minor offences, eight first and six second offence cases and convictions were made in each case.

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A modern concrete fishway was constructed in the dam owned by the Nashwaak Pulp and Paper Company on the Nashwaak river at the town of Marysville, York county, during the autumn of 1923. This was built in place of a wooden fishway (on the opposite side of the river) which had been carried away during the spring freshet of 1923. The expense of the new pass was borne jointly by the department and the Nashwaak Pulp and Paper Company. It was not completed until late autumn, therefore, the large number of salmon which ascended that river about the first of October were unable to pass beyond the dam. The fishway appears to be a substantial and well built affair, and I think it is now in the right location for salmon to use, which was not the case with the former pass. Salmon do not ascend the Nashwaak river (with the exception of only an odd fish) every year, and very few ascend that river before autumn during any season. Practically none ascended during 1922. Large numbers did so (to the dam) in 1921 and 1923. The water conditions appear to be the controlling factor. While the river was very low during 1922 and 1923, in the latter year about the 1st of October, a considerable quantity of lumber (logs) was brought down the river by flushing with water held at the upper parts of the river, each day. As soon as this work began, salmon began to ascend the river, and it is the opinion of your department's engineer and others, that the flushing (fresh water being let out, or forced out) each day attracted the salmon. A heavy rain in the Nashwaak valley in the autumn has the same effect and then salmon will ascend the river.

Prosecutions for all offences during 1923 numbered twenty-six, as against fifty-three in 1922. Confiscations numbered twenty-six, as against thirty-five during 1922, and prosecutions followed in every instance where evidence connecting any person or persons with the offence could be established. Seizures consisted mostly of salmon nets, with a few shad and whitefish nets. All illegal or valueless-to-sell materials were destroyed. Legal materials that could be were sold. Some nets are still held and it is expected that these will be sold when fishing opens up again in the spring of 1924.

Moneys collected in the way of fines during the year amounted to the sum of \$613.50. In addition, fines to the amount of \$330 were imposed, and the penalties suspended pending good behaviour on the part of the offenders.

FISHERY LICENSES AND PERMITS

The following licenses and permits were issued by me during the calendar year 1923:—

	1923	1922
Salmon fishery licenses.....	105	112
Salmon net fishing permits (nontidal).....	129	123
Shad gill-net or drift-net licenses.....	219	254
Bass fishery licenses.....	15	18
Sturgeon fishery licenses.....	11	9
Smelt gill-net licenses.....	1	1
Whitefish fishery licenses.....	Nil	10

REPORT OF INSPECTOR S. T. GALLANT, PROVINCE OF PRINCE EDWARD ISLAND AND MAGDALEN ISLANDS, FOR 1923

Owing to unusual weather conditions the ice did not leave the shores until well on in May; consequently lobster fishing did not become general until May 18. Fine weather followed and a normal catch was obtained, with the exception of that part of the coast from Nail Pond to Victoria where the catch was one-third less than that of last year. There was no loss of gear. The fishermen received good prices, especially in Prince County where a large portion of the catch was sold in the shell and fancy prices realized. On the whole the season might well be termed a successful one.

In 1923, in comparison with 1922, there was an increase of ten (10) canneries, with an increase of 76,189 traps. As a result of the decrease in the market value of canned lobsters I do not anticipate that this fishery will be carried on to the same extent in the season 1924.

Spring herring fishing was good yielding an increase of 13,897 cwt. The canneries, therefore, were well supplied with bait during the entire season.

The codfish industry suffered a decrease of 4,202 cwt. due, no doubt, to the low prices offered at the opening of the season. A large number of fishermen left the Province to secure more lucrative employment elsewhere. The fish were very plentiful all summer and towards the latter part of the season good prices were realized, so that those who followed up this fishery were well paid for their labour.

There was an increase of 32 cwt. in the haddock catch and a decrease of 4,772 cwt. in hake and cusk.

Although spring mackerel were plentiful the fishermen did not fish to any extent on account of the low prices offered in the American Market and the high cost of transportation; the duty, too, was quite a factor in discouraging fishermen from shipping to the above-mentioned market. Quite a few mackerel were caught with hook and line in Queens county, and good prices were obtained for same.

There was a decrease of 1,176 barrels of oysters this year, due to the fact that there were 79 fishermen less fishing this season. The buyers were very particular in purchasing only full-sized oysters; consequently the demand was good throughout the season and fancy prices were realized. East and West rivers, and tributaries, also Vernor, Seal and Orwell rivers are well stocked with young oysters and we are looking forward to a good catch next year. When going over the oyster beds in Richmond bay, one-, two-, and three-year-old oysters were examined and found in a healthy condition, but the beds are so badly silted that the spat cannot catch and before these beds will become productive, they will have to be cleaned. It is our intention next summer, with the help of a few local men, to clean part of a bed and deposit two or three barrels of oysters on same in order to ascertain whether or not the blight still exists. This, I think, is a good move, as the department would scarcely be justified in spending money cleaning the beds until it was a positive fact that the oysters would not contract the disease which has been prevalent in the rivers of Prince County for the last seven or eight years.

There was an increase of 15 cwt. in the catch of salmon, Morell, Kings county, being the only place where this fishery was carried on. This increase is due to the fact that the fishing season was extended from the 15th to the 31st August. It is expected that there will be further development in this fishery in the near future as salmon were quite plentiful after August 15 in at least a dozen of the streams. Alberton, New London, and Richmond bays are well suited for salmon fishing. The fishermen at Morell received from 20 to 25 cents per pound for their catch last season and this should be an inducement for others to engage in this valuable and profitable fishery. For fishing at Morell three nets of 20 fathoms each are used, a pound is made of one net, while the other two are used as leaders; the total cost of these nets is about \$75, but, in view of the great demand for salmon and the high prices paid for same, this should offer no difficulty to those engaged in this fishery. I, therefore, anticipate considerable development in this industry within the next two years. A few salmon were caught by angling but there is no means of ascertaining the exact number caught.

Smelt fishing was good; the fish were large especially those caught with gill-nets. There was an excellent demand for them, and those engaged in this

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fishery were well paid for their time and labour. Bag-net fishing was delayed as the ice did not make in the rivers until the last days of December. Heavy catches are reported for the first two weeks of January from all parts of the province.

FISHERIES PROTECTION SERVICE

I am pleased to report that there was very little illegal lobster fishing this season. The new system of protection inaugurated last spring, that of long-term guardians patrolling the shore from West Point to Richmond bay, afforded splendid results, and, if the same system is employed for another year or more, there is no doubt that illegal lobster fishing in this Province will be a thing of the past.

FISHERIES PROTECTION SERVICE BY PATROL BOAT "RICHMOND"

The patrol *Richmond* was in charge of Captain Thomas Baglole and Assistant Fred. McKinnon, and began her patrolling duties on July 12 after being made ready for sea she continued patrolling until December 14, when she was laid up in her winter quarters at Ellis river.

The following seizures of lobster gear were made:—

Year	Rope	Traps	Crates	Anchors
1923.....	1,400 fath.	192	2	7
1922.....	2,900 "	688	..	..

It will be noticed that there is a considerable decrease in the amount of gear seized which may be attributed to the fact that the patrol *Richmond* rendered most efficient service, successfully frustrating at the outset any attempt made at illegal fishing. I may safely say that so long as Captain Baglole and his assistant are in charge of the above-mentioned patrol there will be very little illegal fishing carried on in Richmond bay.

MAGDALEN ISLANDS

The lobster fishing season opened on May 1 but did not become general until May 24, as the ice did not leave the shores until around May 20. A period of fine weather followed resulting in an increase of 3,723 cwt. over last year's catch.

By reason of the improved sanitary conditions and the up-to-date equipment installed the canneries in the Magdalen islands may well be numbered among the best in the Maritime Provinces. Several new canneries have been built and equipped with the most modern conveniences, and the goods put up by the Magdalen islands packers are of a highly satisfactory quality.

There is an increase of 4,266 cwt. in the catch of cod to report. The catch was quite satisfactory to those engaged in the fishery, there being an exodus of some 125 fishermen from the islands immediately after lobster fishing closed.

Herring, as usual were plentiful but as there was very little demand for them we have to report a decrease of 20,374 cwt.

There was very little demand for mackerel, although they were plentiful in June, and there was consequently a decrease in the catch of 13,419 cwt. The bulk of the catch was split and salted, and the quality was far superior to that of last year.

I have to report a decrease of 555 barrels in the catch of clams.

TRANSPORTATION

It is pleasing to note that a better boat will be placed on the Pictou-Souris route this season. This no doubt, will improve transportation facilities and be an encouragement to the fishermen to engage in the various fisheries on a still larger scale.

HARBOUR FACILITIES

On the north side of the islands, where the best codfishing grounds are located, there are no harbours which afford shelter to the fishing boats. It is estimated that some 2,000 quintal more codfish might have been landed at Etang du Nord last year had there been harbour accommodation at that point.

REPORT OF J. B. SKAPTASON, INSPECTOR OF FISHERIES, PROVINCE OF MANITOBA, FOR THE YEAR 1923

In a general way the year just passed may be considered reasonably successful for both fishermen and dealers. Practically the only exception is that of the summer whitefish operation on Lake Winnipeg from June 1 to August 15, which was a loss to both fishermen and companies operating. The only other variety of fish to show a decrease in production is the winter catch of tullibee. This, however, was very largely compensated for by the much higher prices that obtained than the previous year. All other varieties show a marked increase, and while these increases do not make up for the decrease in whitefish and tullibee, rather leaving the actual production for 1923 over two million pounds short of 1922, the amount realized by fishermen is shown to be nearly eighty-two thousand dollars greater, and the actual market value one hundred and eleven thousand dollars more for the catch of 1923 than that of 1922.

A very definite and valuable increase is indicated in sturgeon fishing, which is fully double that of the previous year. The increase is only partially accounted for by the greater number of licenses issued and men fishing, 183 as against 137 in 1922, or about 25 per cent more, while the increased production is fully 50 per cent greater. The demand for sturgeon was very good, creating a top price, giving each licensee a much higher average, or \$340 per license in 1923 as against \$162 in 1922. This fishing is largely carried on by Indians in a desultory sort of way with small and inefficient outfits, during two or three months of the summer, the results obtained by each man may therefore be considered reasonably lucrative.

Special attention is given all sturgeon fishing grounds in this inspectorate, with a view to watching for possible depletion. It is gratifying to be able to report, all these fisheries appear to be well supporting their various limits.

The Pas, Sub-District, comprising all waters north of 53 parallel excepting the northern parts of lakes Winnipeg and Winnipegosis, shows no summer fishing during 1923, excepting for sturgeon. This was carried on to a marked degree more extensively than in late previous years, with much increased individual results. The increasing of the limit on the Saskatchewan river and its expansions from 50,000 to 65,000 pounds, appear to me fully justified.

Winter fishing in these waters was carried on in a slightly lesser degree than previous year, the production, however, is slightly greater than that of the preceding winter. The reason for the light winter operation is accounted for by the very high cost of freighting the fish to railhead, as teams, and fodder for them, have to be shipped into the district.

Lake Winnipeg.—There has been an unaccountable falling off in the production of whitefish during the past two summer seasons on lake Winnipeg. The limit for the season which extends from June 1 to August 15 is 3,000,000 pounds. The following is the catch for the past three seasons:—

1921
2,927,098 lbs.

1922
2,472,470 lbs.

1923
1,455,404 lbs.

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It is not generally considered there need be any fear entertained, that this is an indication of depletion, rather the fish failed to school and kept scattered at various depths of water, making it more difficult for the fishermen to locate them. During the fall pickerel fishing, carried on in that portion of the lake lying south of Black Bear island, there has been a very noticeable increase in the whitefish catch all along the line, some places at times reporting from 10 per cent to 20 per cent whitefish as against pickerel, where a few years ago whitefish would hardly be seen during the whole season. This is generally ascribed to the Gull Harbour hatchery which is situated in the centre of this area.

Sturgeon fishing on this lake was carried on more extensively than in late previous years, and more than doubling the production of 1922. Sturgeon appears to be keeping up fairly well with the limited fishing carried on in the lake. A small attempt was made during the past summer at hatching of sturgeon eggs in Playgreen lake, no success was met with, in fact owing to the special adverse local conditions it was not found possible to obtain the parent fish in proper condition. The officer who had charge of this experiment, Mr. C. P. Paulson, Superintendent of the Gull Harbour hatchery, is confident the experience gained last spring will materially improve chances for success another year, and it is contemplated to make another try this coming summer at Berens river.

Lake Winnipegosis.—This lake enjoyed a normal season and a fair output. No summer fishing for whitefish was carried on, but during the fall season for pickerel, 166,000 pounds of whitefish was produced on what is not generally considered whitefish grounds. There is a feeling amongst the fishermen that whitefish is improving in the lake.

Last spring (1923) the department in response to a petition of fishermen, made a decided attempt at reducing to some extent the suckers or mullets in lake Winnipegosis. These fish have become a serious menace on the whitefish spawning grounds of the lake. The work was carried on under the direction of S. J. Walker, Inspector of Hatcheries. Three of the principal streams in the south end of the lake up which these fish run in spawning season, were blocked and all the fish taken. An offer of the department to transfer the fish to lakes on the Prairies that had no fish life was well received, and a large number of these fish were so disposed of throughout Manitoba and Saskatchewan.

Lake Manitoba.—The green fish industry is much on the increase throughout the west, all lakes where railway facilities are such as to allow of the fish being shipped fresh become very popular with fishermen, who are inclined to over-crowding in these waters. Lake Manitoba this present winter season is supporting practically 800 fishermen, or almost half the winter fishermen of the province, about 75 per cent of that number are operating in the comparative small area south of the narrows on the lake. The increase in fishermen on this lake as against winter 1922-23 is about 30 per cent. This is a comparatively small lake with no great depth of water, and it is unthinkable that it can indefinitely support the tremendous drain it is subjected to. It is, therefore, felt the now proposed hatchery for this lake cannot be put into operation a day too soon.

We had a visit during the past summer from Mr. Wm. A. Found, Director of Fisheries Service. It was the occasion of a get-together movement amongst fishermen as well as operators, and several very representative meetings were held by Mr. Found, and those directly interested in the industry. This was also an opportunity used by the Director of Fisheries to make a most thorough inspection of the various fisheries on lake Winnipeg, as well as the hatchery conditions on the lake.

All the officers of the district have shown commendable diligence in the performance of their duties.

During the year there were twenty-three prosecutions under the Fishery Regulations in the province, as follows:—

Fishing without license.....	6
“ in closed season.....	3
“ with illegal mesh nets.....	3
“ in weekly closed time.....	2
“ by means of explosives.....	3
Possession of fish closed season.....	6

REPORT OF G. C. McDONALD, INSPECTOR OF FISHERIES, PROVINCE OF SASKATCHEWAN, FOR 1923

The total catch for the year shows an increase of 5,751 cwts. over the previous year. The catch during the summer season has increased 2,239 cwts., and the catch during the winter season has increased 3,512 cwts. This increase of both summer and winter catches is due to more fishermen operating in almost every district in the province, there being an increase of 165 fisherman licenses issued during the year. The winter fishing season was delayed from ten days to two weeks during December on account of the unusually mild weather, resulting in there not being sufficient ice on the lakes to allow the fishermen to operate.

There is an increase shown in the value to fishermen of \$30,608, and an increase in the market value of \$41,306 due to larger production. The price obtained by the fisherman as well as the market value was about the same as during the previous year.

There has been an increase of 165 fisherman commercial licenses issued during the year. This is probably due to the low price obtained by the farmers for their produce as well as the increased demand for fish.

There are no waters showing any immediate signs of being depleted that would require any special restrictions during the near future, except probably Dore lake and Okemasis lake. During the last few years Dore lake has accounted for the largest production of fish of any lake in the province, and if the number of licenses issued on this lake continues to increase it might be found necessary to place a limit on the total production. This matter will receive attention at the close of the present winter fishing season, when more information will be available. Okemasis lake has been fished considerably during both the summer and winter seasons for a number of years, on account of its close proximity to the railroad, and if this strain continues on the lake it might be found necessary in the near future to place a limit on it also, and owing to its being so conveniently near the railroad I might suggest the placing of a generous quantity of whitefish spawn in it from the hatchery.

During the year there were seventy-six prosecutions and a conviction secured in every case, resulting in fines amounting to \$387.50, being imposed with additional costs on the defendants of \$265.60, according to the following:—

Fishing with nets without a license.....	8
Fishing during close season.....	32
Fishing with illegal apparatus.....	28
Illegal possession of fish.....	5
Selling fish taken under free permit.....	1
Damming of streams.....	2
	<hr/>
	76

There were sixty-eight confiscations and forty-four sales of confiscated articles made during the year.

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Of the twenty dams reported during the year five of these were repaired and two new fishladders built in the Carrot river and Stoney creek dams. All fishladders in dams in the province are now reported to be in good condition.

Under equipment there is an increase shown for the year of 392 gill-nets due to more fishermen operating. There is also an increase shown of six gas boats, ten rowboats, two ice-houses, and three piers all on Turtle and Jackfish lakes and used in connection with the summer's operations. There is a decrease of six smoke-houses on Jackfish, Turtle and Dore lakes.

Reports show that during the year there was an increase of 1,803 cwts. of fish, with an increased value of \$9,938, taken under domestic license. This is due to there being an increase of 179 domestic licenses issued during the year.

There is also an increase shown of 4,836 cwts. of fish taken by anglers with an increased value of \$40,700. This is reported due to there being an estimated increase of 4,022 anglers.

REPORT OF R. T. RODD, INSPECTOR OF FISHERIES, PROVINCE OF ALBERTA, FOR 1923

A total amount of 51,862 cwts. of all kinds of fish were caught in the district of northern Alberta during the summer and winter seasons of 1923, an increase over the year 1922 of 6,173 cwts. Increased catches may be noticed in both trout and whitefish as well as the coarser varieties. The increase in trout is found chiefly in the lac la Biche district. An increase of about 2,000 cwts. of whitefish is accounted for by the following lakes: Primrose lake (Cold lake district), where a larger number of men operated, and the fishing was exceptionally good. Pigeon lake, also chiefly due to more fishermen operating. This lake is in a particularly healthy state. Moose lake and Athabasca lake district. The fishing in Fawcett lake and Calling lake was excellent. The above lakes were operated during the winter seasons. In the summer increases are noted in lac Ste. Anne, Wabamun, lac la Biche and Cold lake districts. It is most gratifying to note that Wabamun and lac Ste. Anne are again showing an increase in catch, and this can be accounted for by the heavy rains of the summer of 1923, which helped to raise the abnormally low waters of these two lakes. An increase will also be seen for Cold lake, which was fished for the first time on a commercial scale during the summer months.

A decrease in the catch of Lesser Slave lake is noted during the summer of 1923, where the maximum amount of 15,000 cwts. of whitefish fell short by 1,460 cwts. The maximum amount could easily have been obtained were it not for the fact that operations were suspended for a week at the opening of the season, owing to the phenomenal catch of the first week, which taxed the shipping facilities to the limit. After the first two weeks or so the fish scattered over the lake and the fishing was very poor. I recommend that the catch for this lake be restricted to a maximum of 10,000 cwts. instead of the present quantity.

During the winter it was also noticed that the catch of whitefish at Buffalo lake showed a large decrease, which can be accounted for through the serious delay in the commencement of fishing in December, 1923, owing to the exceptionally mild weather and lack of snow. Ice did not form in sufficient thickness to allow of fishing until the third week in December, and then only with great danger and difficulty. Indeed several of the companies operating lost horses through the ice breaking whilst hauling fish to the shore. Reports indicate, however, that in the latter part of the season 1923-24 the fishing at this lake was very good, and from the account received in this office there is no reason to believe that this lake is in anything but a fine condition. A decrease

is noticed in the Cold lake district in the catch of trout, although there were a greater number of fishermen fishing. This lake is considered to be in a depleted condition, and the department has now placed a limit on the amount of fish to be taken. A decrease in the Trout lake district resulted through no operations around lac la Biche and a smaller catch on Winifred and Christena lakes, not as many men operating on these lakes as formerly.

MARKETS

The markets during the year 1923 were exceptionally good, and keen competition between the various buyers was evinced, with a consequence that the fishermen obtained excellent prices. As high as 9 cents per pound was obtained in some cases for whitefish. Further an excellent market is now assured for lake trout, formerly difficult to dispose of in large quantities.

TRANSPORTATION

Transportation facilities show still more improvement both by the Edmonton and Dunvegan Railway and Alberta and Great Waterways Railway. During the summer two carloads of fish were upset on the former railway, but such was the assistance given that within twenty-four hours every pound of fish was on its way again to Chicago, and not a pound was lost. The latter railway proposes to assist in the breaking of a new trail to Buffalo lake on a lower elevation, that will decrease the now heavy overhead expenses to very appreciable degree, and will prevent the loss of fish on the trail.

EQUIPMENT

Further improvement is shown in the equipment, a larger number of gasoline boats being used at Lesser Slave lake, as well as deeper mesh nets. More attention is now being shown towards the cleaning and marketing of fish in good condition.

OBSERVANCE OF THE REGULATIONS AND PROSECUTIONS

There were twenty-six prosecutions of which two were appealed, and the court sustained the appeal with the result that the confiscated articles were ordered returned to the parties prosecuted by the department. Saw-mills have been warned regarding the pollution of streams and a great deal of attention has been shown this class of offender. The following is a list of offences:—

- 3 fishing without a license.
- 2 leaving remains, and offal on the ice.
- 1 fishing without domestic license.
- 5 fishing without angling permit.
- 5 fishing with apparatus other than gill-nets, etc., contrary to section 27.
- 1 killing under the size limit.
- 4 fishing in close season.
- 2 fishing with excess of net.
- 2 fishing with mesh less than 5½ inches for whitefish.
- 1 possession of whitefish in close season.

FISHWAY AND DAMS

These have been carefully inspected from time to time and with the exception of the Eau Clair dam at Calgary they have been reported as being in good condition. A fishway was ordered to be built on the Pembina, where lumbering operations prevented fish passing to their breeding grounds, and this is being attended to this spring.

ANGLING

Owing to the great amount of rain in the southern part of Alberta, angling was not as successful as in years past, although the statistics show that a greater amount of fish was taken, this has been made possible through a closer check on the anglers and their catches. Through the roads being impassable for most of the season the headwaters of the streams have had a rest from the heavy fishing of the past dry years, and this will I think prove of the greatest benefit in the conservation of fish. Overseer Holmes has reported some improvement through the restocking of the lakes and streams in his district by the Banff hatchery.

In conclusion I might state that there are many inquiries regarding the contemplated operations at lake Athabasca during the coming season, and I am confident that in the very near future it will be possible to report the starting of fishing in this lake again. Several new lakes were explored, and one new lake fished commercially—Island lake—near Buffalo lake. This lake, however, is so covered with islands that the fish were not discovered this season in paying quantities. Next year will see one of the companies operating at several new lakes in the vicinity of Buffalo lake, which are said to contain trout weighing in the neighbourhood of 50 and 60 pounds, and also containing unlimited quantities of whitefish.

Inquiries have also been received from a firm in the East as to possibility of establishing a fish oil plant in Alberta, and one for the production of fish essence. At the present time an endeavour is being made to place smoked Alberta whitefish on the menu of the Canadian National Railway which may result in success along this line. Further, one of the companies operating in this province is experimenting along the lines of producing fish cakes canned and manufactured out of the coarser varieties.

REPORT OF CHIEF INSPECTOR MAJOR J. A. MOTHERWELL, WEST-ERN FISHERIES DIVISION (BRITISH COLUMBIA) FOR 1923

SALMON

By reference to statement No. 1, which gives the pack of canned salmon in British Columbia from the year such operations started in the province, it will be observed that the pack for 1923 amounted to the satisfactory total of 1,341,677 cases, the fifth largest since 1876. Previous to 1902 the pack of varieties other than sockeye was negligible and the increase of the past thirteen years particularly has been accounted for by the quantity of the fall varieties canned.

In the Fraser river district the pack of sockeye amounted to 29,423 cases which is practically the same as that of the brood year of 1919. The total of all varieties amounted to 224,637 cases but the comparison of this total with that of previous years would not be enlightening owing to the fact that during 1923 a very considerable portion of the pack of chums particularly was obtained from the Vancouver island district and cannot be properly included with the pack taken from the runs to the Fraser river.

The pack of sockeye on Puget Sound and practically all of which is taken from the run proceeding to the Fraser river, amounted to 47,402 cases as against 64,346 cases in the brood year of 1919. The catch of pinks in the Fraser river district and the Puget Sound Area, and which is practically all taken from the runs proceeding to the Fraser and streams in the immediate vicinity, accounted for 539,494 cases compared with 412,891 cases in the brood year of 1921.

In connection with the run of pinks it is observed that the Americans in Puget sound this year took 475,849 cases compared with 63,645 packed by the Canadian operators in the Fraser River district, although the great percentage of the run is proceeding to the spawning areas on the Canadian side of the line. During the season the run while passing through American waters ran the gauntlet of numerous traps and purse-seines which captured such large quantities that in certain instances it was impossible to market the catch and it was lost.

Seines are not permitted on the Canadian side in the Fraser river area and the fishermen depend on gill-net operations entirely. For some reason or other what was left of the large run of pinks after passing through Puget sound waters remained outside of the Fraser river until close to spawning time and the biggest run in the river occurred during the weekly closed period and a very satisfactory proportion reached the spawning grounds. It would seem that even to a greater extent than in the case of the sockeye, the pinks are protected on the Canadian side largely for the benefit of American competitors.

The run of springs to the Fraser river was the poorest in many years. The run of cohoes was fair, but the supply of chums was extremely satisfactory.

In the Rivers and Smiths inlet districts, which have been combined in the statement of pack for purposes of more accuracy, it will be found that the pack of sockeye amounted to the very satisfactory total of 118,502 cases, the largest since 1920. It will be remembered that in 1919 the drag-seine at Quashella creek, Smiths inlet, after fishing a very short period, was taken out and no seines have been permitted in Smiths inlet area since. This has undoubtedly been a factor in the good pack of 1923. In addition to the satisfactory quantities caught an inspection of the spawning areas shows that a plentiful supply of parent salmon reached the spawning areas.

The average earnings of the gill-net fishermen during the few weeks of operations in this area amounted to approximately \$470 each, the high boat in Smiths inlet produced a net earning of \$1,633 for four weeks' fishing. This was operated by an independent white man. Weather conditions enter very largely into the gill-net fishing operations. In the rainy dark weather the salmon swim deep and a large portion pass under the nets, whereas on a bright sunny day they are to be found nearer the surface and become an easier prey to the nets. During the season 1923 the weather conditions were most favourable although owing to the unusually light fall of rain many of the small streams along the coast, until very late in the season, did not contain enough water to permit the salmon to ascend to the spawning grounds. This was particularly the case in districts fished by purse-seines and drag-seines and unusual precautions were necessary with a view to protecting the salmon waiting at the mouths of these stream.

In the Skeena river district the pack of sockeye amounted to 131,731 cases, the product of the runs of 1918 and 1919, the Skeena river sockeye being four and five years old fish. In view of the fact that the weekly closed season was 48 hours and that there was a net decrease of 191 in the number of gill-net boats fished on the river, the pack would appear to be a satisfactory one. The results of the extended closed period and the reduction in fishing equipment is reflected in a most gratifying way in the splendid quantities of parent fish on the spawning grounds. It will be observed from statement No. 5, that only in one year since 1911 has the 1923 pack of sockeye on the Skeena river been exceeded and only twice since 1877. The runs of the other varieties were satisfactory but the packs apart from the sockeye cannot be taken as representing the size of the run for the reason that while an effort is always made

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to capture as many sockeye as possible, the quantities of the other varieties taken depend entirely on the fluctuating markets.

In the Queen Charlotte islands there is a large run of pinks in the even numbered years and 1923 being an off year at that district the result is reflected in the total pack.

On the Naas river the comparatively good run of the previous season was not maintained, the quantity of sockeye packed amounting to only 17,821 cases compared with 28,259 cases in 1919 and 21,816 cases in 1918. The run of pinks was not so good as in the preceding year or in the brood year of 1921.

The quantity of salmon packed in the province during the past few years and the conditions of the spawning beds would appear to justify the statement that in British Columbia apart from the Fraser and Naas rivers, both of which are contiguous to American waters, there is no fear of depletion of the salmon runs and particularly in view of the existing fishery regulations and the efficacy of the patrol service coupled with the very satisfactory operations of the salmon hatcheries.

HALIBUT

With a total of 334,667 cwts. the landings of halibut at British Columbia ports has established a record during 1923. By reference to statement No. 9 it will be observed that of the total landings 203,666 cwts. were brought in by boats of American registry. A very large percentage of the total landings of the province passed through the port of Prince Rupert and over the Canadian Government Railway system to markets in Eastern Canada and the United States.

In anticipation that the proposed closed season for halibut fishing on the coast would come into effect during the year probably a greater effort than usual was made to fill the cold storage establishments but in spite of the fact that the new regulations did not come into force the market was sufficiently attractive to permit of the large stocks of frozen fish being disposed of.

In connection with the large catch by American boats as compared with that of Canadian vessels, it is interesting to note that during the unfavourable weather when it is impossible for the smaller Canadian boats to fish the most attractive banks off the coast of Alaska, the small American craft are able to continue operations inside the territorial waters of Alaska which results in their delivering a larger catch than the Canadian fishermen. Out of a total of 315 boats delivering halibut at Prince Rupert 210 were under American registry.

In addition to the catch being so large the prices obtained at Prince Rupert reached the highest point since the war. In October, 1923, the price of 23.1 cents per pound was paid for first grade for catches by American boats whereas during the war the highest point reached was 23 cents.

Unfortunately the treaty providing for a closed season for halibut fishing did not pass the American Senate as was expected and cannot come into force until the fall of 1924. Indications, however, would appear to justify the expectation that there will be no further delay.

HERRING

There was a good average run of herring during the year and this particularly applies to the west coast of Vancouver island where the largest operations have been conducted in recent years.

A very large proportion of the catch is dry salted and shipped to the Oriental market. During the year the prices obtained have been unusually attractive, at one time during the season reaching \$82 per ton C.I.F. China. It is interesting to note that the dry salting business is coming more and more into

the hands of the whites. Until fairly recently the Japanese have controlled the industry, the market being China. During the year the Canadian white brokers have handled a very large percentage of the product.

The value of herring products at the point of shipment is approximately as follows:—

One ton of raw herring equals	400 lbs. stock food worth.....	\$ 12 00
do	400 lbs. fertilizer worth.....	10 00
do	30 Standard gals oil worth.....	10 50
do	1,000 lbs. Dry Salted worth.....	20 00
do	1,000 lbs. Kipperd worth.....	90 00
do	30 Cases Canned worth.....	195 00
do	6 bbls. Scotch cured worth.....	75 00
do	Halibut Bait worth.....	30 00

PILCHARDS

At certain seasons of the year on the west coast of Vancouver island pilchards appear in great numbers. During recent years considerable quantities have been canned but recently the market conditions have not been sufficiently attractive to permit of large quantities being put up. A contributory cause is the low price for which such excellent food as canned chum salmon can now be obtained.

WHALING

The whaling stations at Kyuquot, Rose Harbour, and Naden Harbour were operated during the year, the catch showing a considerable increase over the previous season. The number and species of whales taken is as follows:—

Species	Kyuquot	Rose Harbour	Naden Harbour	Total
Sperm.....	32	38	24	94
Sulphur.....	5	26	31	62
Fin.....	54	75	37	166
Hump.....	32	21	25	78
Sei.....	13	37	3	53
BN.....	2	—	—	2
Total.....	138	197	120	455

FUR SEALS

The Indians off the west coast of Vancouver island were particularly successful in fur sealing operations although a considerable number are taken in the vicinity of Hecate straits. A total of 2,979 were cleared through the Customs ports of the province.

DESTRUCTION OF SEA LIONS

As a result of the recommendation made by the Fisheries Commission of 1922 and also following suggestions contained in the report following the sea lion investigation of 1916, further efforts were made during the year looking to the reduction of these mammals found to be so numerous in the close vicinity of some of the principal salmon areas. The C.G.S. *Givenchy* left on the 18th of May for the Pearl and Virgin rocks in Queen Charlotte sound opposite Rivers inlet and Smiths inlet. Operations at these points are extremely difficult owing to the waters in the vicinity being uncharted and the whole area exposed to the sweep of the Pacific. This necessitated absolutely calm weather before approaching the rocks. The total number destroyed amounted to 1,885 including 1,231

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adults and 654 pups. In this work a Lewis gun, several .44 calibre rifles and clubs were used. Undoubtedly the slaughter of so many sea lions just before the valuable sockeye salmon were due to arrive greatly assisted the operations of the gill-net fishermen and numerous gill-netters expressed their delight and stated that their fishing operations were freer of interference from sea lions than they had been for a great many years and attributed these conditions to the sea lion hunt by the department.

PATROL SERVICE

The patrol fleet for the year consisted of the steam trawlers *Malespina* and *Givenchy*, the oil burning steamer *Marfish*, and nineteen gas boats all the property of the department, and in addition fifty chartered gasoline boats and one seaplane. The *Malaspina* logged 13,542 miles and the *Givenchy* 14,404 miles during the season. Fourteen of the gas boats owned by the department logged 93,010 miles, or an average of 6,643 miles each. Four of these gas boats remained on duty the full 12 months. The remainder, together with all the chartered boats were in commission for periods from one month to seven months. For the first three months of the year the C.G.S. *Thiepval*, the property of the Department of National Defence, was also loaned to the Fisheries Department to assist in the patrol of the three mile limit. The *Givenchy* was, during the last two weeks in the year, engaged in life-saving duties on the west coast of Vancouver island with headquarters at Bamfield.

A seaplane with headquarters at Prince Rupert consumed sixty-nine flying hours in fisheries protection work and the results obtained were sufficiently encouraging to justify the expectation that the number of patrol boats can be reduced with certainly no decreased efficiency, but rather with the expectation of more efficient service. There are certain difficulties in connection with seaplane patrol which it is difficult to overcome. In discovering a violation at a considerable distance from a patrol boat or settlement very little can be done beyond taking the name and number of the operator and boat and report to the nearest patrol boat or fishery officer. In the less isolated areas, however, it is usually possible to obtain a patrol boat within a reasonable time to take charge of the offender and his boat. At night and during a fog the plane is of no use but on the other hand in the isolated districts the seining operations which require so much attention can be adequately looked after by the means of the plane. The moral effect on the fishermen is excellent as they never know at what time a patrolman may come upon them from the air.

In addition to assisting with the patrol service next season it is proposed to obtain aerial photographs of the more important spawning areas in District No. 2. An examination by the ordinary means results in the expenditure of considerable money, effort, and time, and in some cases after the difficult task of getting into the upper waters the area has been found of little use. By means of the aerial photographs it will be possible to decide whether it is necessary to send in officers for a more detailed examination. By means of the photographs any serious obstructions in streams would probably be discovered.

At the present time two new 60-foot patrol boats are being built for the department at the Government Dockyard at Prince Rupert. These are being powered with 60 horse-power Beardmore semi-Diesel engines. Undoubtedly the crude oil engine is far more economical and just as efficient as the gas engine. The new boats are expected to be ready early in the spring of 1924. One is to replace the expensive *Fispa* for use of the Inspector of District No. 3 and the other will be used in District No. 2. The *Fispa* has been disposed of to the Vancouver Harbour Board.

REGULATIONS

During the year there were eighty-five prosecutions and seventy-six convictions for violations of the Regulations. The fines and sales from seized fishing equipment amounted to \$3,174.95.

The observance of the Fishery Regulations showed a considerable improvement over previous seasons and this applies particularly to the northern districts where, by a careful reorganization of the patrol service, excellent results have been obtained.

The weekly closed period of forty-eight hours for salmon fishing and which extended from 6 a.m. Saturday of each week to 6 a.m. Monday, was, at the request of the fishermen and other operators in District No. 2, altered for that district to cover the period from Friday at 6 p.m. to Sunday at 6 p.m. This has the effect of permitting all the canning establishments with their large staffs to rest on Sundays and permit the fishermen to obtain the Sunday night's fishing.

REDUCTION IN ORIENTALS

The gradual elimination of the Oriental from the fisheries of the province is primarily for the purpose of providing greater encouragement to White men and Canadian Indians to take up fishing for a living. By reference to the very interesting statement No. 8 the results in connection with the salmon gill-net operations in the several areas will be observed. Extending over the whole province the increase in the number of whites was 9.5 per cent and in the case of Indians 7.4 per cent and in the case of Orientals a decrease of 40 per cent which was recommended by the 1922 Fisheries Commission. The total number of fishermen of all nationalities decreased 534 or 11.9 per cent. On the Fraser river there was an increase of 6.2 per cent in whites but a decrease of 20.6 per cent in the case of Indians. On the Skeena river the increase in whites was 11.9 per cent and 16.2 in Indians.

In the case of salmon trolling while the reduction in Oriental licenses was 25 per cent the increase in Indians was 13.9 per cent but there was a decrease in whites of 6.1 per cent. Out of 1,446 trolling licenses issued for the province 1,154 were issued for District No. 3, 579 for the east coast and 575 for the west coast of Vancouver island.

It is interesting to note that on the east coast the increase in whites amounted to 69.7 per cent and in the case of Indians 343.4 per cent but on the West Coast where operations are considerably more difficult and hazardous there was a decrease of 22.6 per cent in the case of whites and 14.1 per cent in the case of Indians in spite of the reduction of 25 per cent in Orientals.

Cod fishing by means of lines was not licensed prior to 1923 but for the purpose of including this method of fishing in the general reduction in the case of Orientals licenses were required of all nationalities. It is the intention during 1924 to include cod handline licenses in the general policy of a 40 per cent reduction in the case of Orientals.

Owing to the desirability of eliminating or greatly reducing the quantities of grayfish and the necessity for every encouragement to this end and which policy was recommended by the Fisheries Commission of 1922, there is no limitation to the number of grayfish licenses which may be issued to Orientals or other nationalities providing they are British subjects.

The policy of the elimination of the Oriental in salmon seining operations naturally resulted in the development of this class of fishing by whites. The experience has been that white seine crews can be just as efficient if not more so than the Oriental and this applies very largely to the Indian as well.

ANGLING

It is becoming increasingly difficult to fill the requirements of the numerous applications for the stocking of the various lakes and streams with the several sporting varieties of fish. During the year ninety-nine applications were filled by means of Kamloops, Steelhead, Cutthroat, and Eastern Brook trout and Atlantic salmon. A total of 3,241,896 eyed eggs and fry were utilized for this purpose and results have been extremely satisfactory. Many lakes which in the past have never had many fish and others which have become depleted owing to excess of fishing have been stocked much to the satisfaction of a great many angling associations and individuals and much excellent angling will be provided within reasonable distance of the larger centres of population.

SCIENTIFIC INVESTIGATION

It is most gratifying to find that arrangements have been made by which the Fisheries of British Columbia are to receive more attention from the Biological Board with a view to investigating and advising on the numerous problems confronting the industry. The province of British Columbia has long felt the need of such action and although results cannot be expected to become apparent immediately, yet scientific investigation can be depended upon to in the near future show results making for a more intelligent understanding of fisheries problems by both those interested commercially as well as the staff of the Fisheries Department. It is hoped that conditions are being made sufficiently attractive to ensure the retaining permanently of desirable officers and instead of investigations being conducted intermittently there may be a continuity of observations by the same officers which will result in conclusions and solutions of great value to the industry.

BRITISH COLUMBIA FISHERIES COMMISSION, 1922

As a result of the recommendations made by the Commission of 1922 which investigated fisheries affairs in British Columbia, the following alterations were made in regulations and policy:—

(1) After the year 1923 gas boats will be permitted to be used anywhere in the province in salmon gill-net operations. These had previously been prohibited in District No. 2 and sail boats were provided by the canning companies.

(2) The number of fishing licenses issued to other than resident white British subjects and Canadian Indians was reduced by 40 per cent apart from salmon trolling licenses where the reduction was 25 per cent.

(3) The license fees and taxes were very materially reduced resulting in considerable satisfaction to the fishermen and operators generally but naturally reducing considerably the amount of revenue collected.

(4) The fishing boundary limits at the mouths of streams were altered to 400 yards from the mouths of streams. The power was left with the chief inspector for the province to move these further out if considered necessary.

(5) A reserve was arranged in the Cowichan bay area in order that the Fisheries at that point might be allowed to recover and that the several varieties of fish coming to the Cowichan river might receive protection.

(6) The regulation permitting of salmon fishing to commence on May 1 on certain portions of Vancouver island was altered to conform with the balance of the district.

(7) The weekly closed period for salmon fishing was made a uniform one of forty-eight hours.

(8) Departure bay was closed to all herring fishing by means of seines.

INDIANS

Previous to the year 1923 seining licenses have never been issued to Indians although these wards of the Government have been employed largely in the operations conducted with such fishing gear. The Indians have always felt that this was an unfair discrimination against them and the department decided during the year to grant them the same privileges in the way of seining licenses as are enjoyed by the whites. This privilege has been the cause of considerably increased good feeling on the part of the Indians.

Through the co-operation of the several officers of their department, deserving and needy Indians are being provided each year with fishing permits, which will permit them to take, without cost, a sufficient quantity of salmon to meet their requirements in the way of food during the winter season. Salmon so taken are not permitted to be sold.

INSPECTION OF SPAWNING AREAS

Just as far as it is practicable all salmon spawning areas were inspected while the parent fish were on the spawning beds. In this connection it is pointed out that owing to the fact that it is impossible under present conditions to employ the same men year after year for this work the reports received cannot be of as great comparative value as would be the case if the same officer year after year reported on the one area. In some of the most important districts, however, it has been possible to make satisfactory arrangements and the increased value of such information is obvious.

Naas River District.—The inspection of the Naas river area was undertaken about one week earlier than usual and the information obtained would appear to show that the supply of sockeye salmon on the spawning grounds was considerably less than in the fall of 1922 and with very little improvement over that of 1921. It will be remembered that there was a fair run of this variety to the Naas river in 1922 when the pack reached 31,277 cases against 17,821 in the year under review and 9,364 in 1921. A few sockeye were seen at the upper fall and there was a better showing at the lower fall and more were observed coming in as the inspecting officers were leaving.

The run of spring salmon was the best experienced since 1910.

The repairs to the fishway were made during July and at that time the engineer in charge of the work reports that as soon as the water was turned into the structure after the repairs were completed the salmon which were gathered at the base passed through with ease and the run appeared to be a fairly heavy one for a few days.

The report on the Bowser lake section of this watershed was again discouraging and although a small quantity of sockeye salmon was observed conditions would appear not to be suitable for any large run.

Skeena River Watershed.—The reports received demonstrate that again this watershed has been abundantly seeded with sockeye salmon. At Babine lake, which is the principal spawning area for the district, conditions were found to be most gratifying, the spawning beds in practically all the streams being heavily seeded. This condition also applies to Babine river and very satisfactory supplies of the spring and pink varieties were also found. It is only every other year that there is such a large run of pinks to the Skeena.

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It will be remembered that previous to the hatchery operations on the creek draining Morrison lake the supplies of eggs for hatching artificially had to be obtained from the different streams around the lake, but owing to fish cultural operations it is now unnecessary to go further than practically the hatchery door for obtaining more than the sufficient quantity of eggs to fill the hatching troughs to capacity. This is a good illustration of what can be done by the fish cultural methods being carried on by the department.

In the Lakelse lake area there was also a splendid supply of sockeye and pink salmon. A good run of sockeye has also been reported from the Kitsumkalem area.

Several cannery managers on the Skeena during the summer remarked on the good run of sockeye up the Oxtahl river and which they stated was undoubtedly due largely to the work of clearing the obstructions to the ascent of salmon and which work was done four years previous permitting the parent fish to reach the spawning grounds.

The run of spring salmon to the Skeena was the best experienced since 1910.

Central Division.—The streams on the mainland of this area which are fed by glaciers had a plentiful supply of water throughout the summer and the salmon were able to ascend to the spawning grounds but on the islands conditions are very different and frequent rain is necessary to keep the streams full. Unfortunately last summer was an unusually dry one and it was necessary to give this area increased attention in the way of patrol service in order to protect the parent fish until the rains arrived later in the fall when they were able readily to pass up.

Bella Coola and Kimsquit.—The spawning areas in this vicinity were fairly well seeded.

Rivers Inlet.—Conditions at this point were found to be most satisfactory. The provincial officer, our own overseer and the superintendent of the hatchery, all agree that the spawning beds were abundantly seeded with sockeye and that the run to the Inlet was one of the best in recent years.

Undoubtedly the very considerable amount of work done in 1919 in the way of clearing obstructions to the ascent of salmon in the several tributaries of Owekano lake contributed very largely to the good supply of salmon in 1923.

Smiths Inlet.—Conditions in this area were found to be similar to those in the Rivers Inlet district. The fishery overseer states that the showing of sockeye was the best seen by him since 1918. It will be remembered that in 1919 in the middle of the fishing season the seining operations at Quashella creek were stopped and this no doubt has a bearing on present conditions.

Queen Charlotte Islands.—It is only in the even numbered years that the large run of pinks occurs in this district. The quality of these pinks is equal to any pink salmon taken on the Pacific coast. Although the off year for the above mentioned variety the spawning grounds were well seeded with chums and the conditions in the several streams were such as to permit of a reasonably easy ascent to the spawning grounds.

Alert Bay District.—The principal stream in this area is the Nimpkish river. During the season there were no fewer than ten drag-seines operating at this point for sockeye. Fishing was not permitted, however, until the 20th of June, although in previous years operations commenced during the last few days in May. The result was that an abundant supply of parent fish were able to reach the spawning areas.

Cohoes and chums were plentiful everywhere but owing to this being the off year for pinks the supply of that variety was light.

Quathiaski District.—The run of sockeye to Heydon bay and Port Neville was good, although that to Philips arm was not up to expectations. There was an excellent run of the coho variety although pinks and chums were not so numerous.

Pender Harbour District.—No cannery operations were conducted in this district during the season. The Sauch-en-Auch creek area which has been receiving considerable attention during the past few years from the Department was again plentifully supplied with spawning sockeye. The runs of coho and chums were very satisfactory and in certain portions of the district this applies to pinks as well.

The streams on the east coast of Vancouver island generally were well seeded with chums particularly.

At the Cowichan river, which is one of the principal angling streams on the coast, the fishery officers report excellent catches of rainbow and cutthroat trout. The prohibition of the use of salmon eggs or compound in angling will undoubtedly greatly assist conservation of the sport fish.

West Coast of Vancouver island.—The only sockeye districts on the west coast of any considerable importance are at Kennedy river in Clayoquot sound, and Anderson, Sproat and Stamp rivers in Barclay sound. The supply at Kennedy lake, although the pack at the cannery at the mouth of the river was 4,482 cases of sockeye as against 5,393 in 1922, proved to be rather disappointing. The collection of eggs at the hatchery amounted to only 5,306,000.

At Anderson river the conditions were much more satisfactory and the hatchery situated on the lake was filled to capacity and by far the largest percentage of parent fish were permitted to deposit their eggs naturally. The runs to the Sproat and Stamp rivers were light.

The supply of chum salmon on the west coast was excellent and this applies particularly to the Barclay sound district, the spawning streams being splendidly seeded.

Fraser River Watershed.—In the districts above Hells gate the reports received show that the runs of salmon were extremely disappointing. The Quesnel lake, Bowron lake and Chilco lake districts provide no encouragement.

In the Shuswap area, however, the local officer reports an improvement over the year previous and particular reference is made to the South Thompson, Little river, Adams river and Barriere river.

At Harrison lake there was an unusually large run of sockeye and 11,162,000 eggs of this variety were taken at the outlet of the rearing ponds and evidently were fish returning as a result of a distribution of fry from these ponds four years previous. The collection at Morris creek was also a very satisfactory one. It is noted that the supply of the sockeye variety taken during this year's spawning operations was the largest since 1915.

In the Birkenhead river there was, as usual, an excellent supply of parent fish. The hatchery was easily filled to capacity and large quantities of spawning fish were permitted to deposit their eggs naturally.

There was a good run of the several varieties apart from the sockeye. The supply of pink salmon this year requires special mention. In spite of prophesies to the effect that overfishing had largely depleted the pink run, the numbers arriving this year exceeded all expectations and the spawning grounds in the lower Fraser, Howe sound, and Burrard inlet were very heavily seeded. It is only in the odd numbered years that the large run of pinks occurs to the Fraser.

GENERAL

Owing to the reduction of 40 per cent in the number of salmon gill-net licenses issued to others than resident white British subjects and Canadian

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Indians during the year, there was a smaller amount of fishing equipment in operation in most of the salmon gill-net areas and this fact undoubtedly contributed to the splendid conditions found on most of the spawning beds at the head of the gill-net areas.

DEPARTMENTAL OFFICERS

The industry was fortunate during the year in having the opportunity to discuss locally the numerous fishery problems with the minister, the deputy minister, and the assistant deputy minister, who visited the coast.

STAFF

As a result of the development of the fisheries of the province and the requirements of the several departments, the staff is kept exceedingly busy and in spite of much overtime it is becoming more and more difficult to keep up with the work. It is a great pleasure to testify as to the loyalty of the staff in the province in spite of the volume of work which is required of the members.

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1905.....	67	"	"	"	1,080,673	(28,359	Red & Wh. Springs)	44,458	13,970.....	1,167,460
1906.....	64	"	"	"	459,679	31,261	69,132	(68,305Pks.&Ch.)	547,460
1907.....	58	"	"	"	314,074	23,159	.....	.....	87,900	(118,704	542,459
1908.....	52	"	"	"	355,023	25,433	.....	.....	81,917	(76,448	542,689
1909.....	72	"	"	"	840,441	18,218	.....	.....	61,918	(46,544	967,920
1910.....	58	"	"	"	565,915	19,313	.....	.....	74,382	34,613	58,362
1911.....	59	"	"	"	383,509	38,751	.....	.....	119,802	305,247	91,951
1912.....	57	3,640	.....	92	444,762	62,345	.....	.....	165,309	247,743	58,355
1913.....	78	4,782	.....	74	972,178	37,433	.....	.....	69,822	192,887	77,965
1914.....	63	4,857	.....	61	536,696	32,908	.....	.....	120,201	220,340	184,474
1915.....	63	4,951	.....	61	476,042	51,734	.....	.....	146,956	367,352	82,000
1916.....	72	4,600	.....	80	214,789	51,231	.....	.....	183,623	280,644	240,201
1917.....	94	5,286	1,370	99	339,848	48,630	.....	.....	157,589	496,759	475,273
1918.....	88	5,073	1,786	122	276,459	65,535	41,819 Pk.. & Wh.)	(11,740 BB. & SH.)	191,068	527,745	497,615
1919.....	82	4,598	2,260	139	369,445	73,179	9,077	24,323	175,670	346,639	372,035
1920.....	65	4,761	1,855	155	351,405	95,983	8,441	8,061	101,972	520,856	84,626
1921.....	56	4,777	1,452	59	163,914	36,725	6,061	7,060	117,288	192,906	71,408
1922.....	64	4,491	1,513	143	299,614	21,163	11,913	6,431	102,845	581,979	258,204
1923.....	61	3,957	1,446	223	334,647	17,559	4,858	7,097	112,044	440,932	418,055

NOTE.—Licenses issued 1923 include transfers from one district to another.

PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1876 TO 1923

STATEMENT No. 2.

Year	Num-ber of can-neries oper-ated	Number of salmon licenses issued					Sockeye	Red Spring	Pink Spring	White Spring	Blue-backs	Steel-heads	Cohoos	Pinks	Chums	Totals	
		G.N.	Troll.	P.S.	D.S.	T.N.											
1876	3	Particulars not available.					“	“	“	“	“	“	Particulars of varieties not available—practically all sockeye.				9,847
1877	5	“	“	“	“	“	“	“	“	“	“	“	“	“	“	64,387	
1878	8	“	“	“	“	“	“	“	“	“	“	“	“	“	“	105,101	
1879	7	“	“	“	“	“	“	“	“	“	“	“	“	“	“	50,490	
1880	7	“	“	“	“	“	“	“	“	“	“	“	“	“	“	42,155	
1881	8	“	“	“	“	“	“	“	“	“	“	“	“	“	“	142,516	
1882	11	“	“	“	“	“	“	“	“	“	“	“	“	“	“	199,104	
1883	13	“	“	“	“	“	“	“	“	“	“	“	“	“	“	109,701	
1884	6	“	“	“	“	“	“	“	“	“	“	“	“	“	“	38,437	
1885	6	“	“	“	“	“	“	“	“	“	“	“	“	“	“	89,617	
1886	11	“	“	“	“	“	“	“	“	“	“	“	“	“	“	99,177	
1887	12	“	“	“	“	“	“	“	“	“	“	“	“	“	“	130,088	
1888	12	“	“	“	“	“	“	“	“	“	“	“	“	“	“	76,616	
1889	16	“	“	“	“	“	“	“	“	“	“	“	“	“	“	303,875	
1890	16	“	“	“	“	“	“	“	“	“	“	“	“	“	“	241,889	
1891	11	“	“	“	“	“	“	“	“	“	“	“	“	“	“	178,954	
1892	11	“	“	“	“	“	“	“	“	“	“	“	“	“	“	79,715	
1893	21	“	“	“	“	“	“	“	“	“	“	“	“	“	“	457,707	
1894	20	“	“	“	“	“	“	“	“	“	“	“	“	“	“	363,967	
1895	21	“	“	“	“	“	“	“	“	“	“	“	“	“	“	400,368	
1896	29	“	“	“	“	“	“	“	“	“	“	“	“	“	“	356,984	
1897	35	“	“	“	“	“	“	“	“	“	“	“	“	“	“	860,459	
1898	35	“	“	“	“	“	“	“	“	“	“	“	“	“	“	256,101	
1899	41	“	“	“	“	“	“	“	“	“	“	“	“	“	“	510,383	
1900	48	“	“	“	“	“	“	“	“	“	“	“	“	“	“	316,522	
1901	49	3,832	Particulars not available				“	“	“	“	“	“	“	“	“	990,313	
1902	42	2,685	“				293,477	Other Varieties:				33,618	“	“	“	327,095	
1903	35	3,101	“				204,809	(2,034: Red and White Spring)				“	“	4,504	“	237,125	
1904	23	2,224	“				72,688	(9,482: Red and White Spring)				“	“	1,066	“	128,903	

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1905.....	38	2,770	"	837,489 (5,507: Red and White Spring)	30,836	3,304 (15,543 Pk. & Ch.)	877,136
1906.....	24	1,746	"	183,007	.....	34,413	(63,530 Pk. & Ch.)	240,486
1907.....	18	1,726	"	59,815	.....	35,766	(415 Pk. & Ch.)	163,116
1908.....	16	1,374	"	63,126	.....	24,198	.....	89,184
1909.....	38	2,688	"	542,248	.....	21,540	(1,987 Pk. & Ch.)	567,203
1910.....	21	1,577	"	133,045	.....	27,855	.....	223,148
1911.....	15	1,396	"	58,487	.....	39,740	.....	301,344
1912.....	15	1,430	2	108,784	.....	38,574	.....	173,921
1913.....	35	2,560	2	684,596	.....	11,648	.....	732,059
1914.....	20	2,656	.....	185,483	.....	38,639	.....	328,390
1915.....	22	2,616	.....	89,040	.....	34,114	.....	289,119
1916.....	21	2,240	.....	27,394	.....	24,580	.....	106,440
1917.....	29	2,626	8	123,614	.....	25,895	.....	377,988
1918.....	18	1,582	19	16,849	.....	40,111	.....	206,003
1919.....	14	1,337	1	15,192	.....	39,253	.....	158,718
1920.....	11	1,288	28	29,628	.....	22,934	.....	132,860
1921.....	13	1,437	25	44,598	.....	29,978	.....	103,917
1922.....	10	1,296	17	35,900	.....	23,587	.....	137,482
1923.....	11	964	.....	48,744	.....	20,173	.....	224,637
			.....	29,423	.....		.....
			.....	3,554	.....		.....
			.....	10,561	.....		.....
			.....	11,360	.....		.....
			.....	11,197	.....		.....
			.....	15,192	.....		.....
			.....	15,519	.....		.....
			.....	19,961	.....		.....
			.....	2,188	.....		.....
			.....	2,204	.....		.....
			.....	3,592	.....		.....
			.....	24,274	.....		.....
			.....	18,916	.....		.....
			.....	4,944	.....		.....
			.....	3,760	.....		.....
			.....	635	.....		.....
			.....	328	.....		.....
			.....	34	.....		.....
			8	
			5	
			15	

NOTE.—Licenses issued 1923 include transfers from other districts.

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1905.....	6	"	"	"	90,713	(351 Red & Wh. Spr.)	181	750	66	6,240	(700 Pk. & Ch.)	19	105,314	91,064
1906.....	8	"	"	"	132,631								144,398	132,878
1907.....	8	"	"	"	97,874								127,066	105,564
1908.....	8	"	"	"	74,452					9,505	(4,679 Pk. & Ch.)		158,798	89,890
1909.....	8	"	"	"	102,527					1,400	(300 Pk. & Ch.)		105,314	
1910.....	8	"	"	"	141,921					2,075			144,398	
1911.....	8	"	"	"	105,763					8,287	6,411	5,288	127,066	
1912.....	8	"	"	"	129,217					11,095	11,723	4,843	158,798	
1913.....	8	"	"	"	79,345					3,708	4,287	2,015	90,944	
1914.....	*7	"	"	"	89,890					7,789	5,784	5,023	109,082	
1915.....	8	"	"	"	162,651					7,115	2,964	5,387	179,431	
1916.....	9	"	"	"	58,192					15,314	3,567	20,144	112,629	
1917.....	10	"	"	"	75,326					9,124	8,065	16,101	113,753	
1918.....	10	"	"	"	68,447					12,074	29,542	6,729	128,937	
1918.....	10	"	"	"	66,842					12,074	29,542	6,729	128,937	
1919.....	11	"	"	"	73,754					9,038	6,538	7,089	110,736	
1919.....	11	"	"	"	72,072					9,038	6,538	7,089	110,736	
1920.....	10	"	"	"	142,793					2,922	26,189	1,226	174,938	
1920.....	10	"	"	"	153,245					2,922	26,189	1,226	174,938	
1921.....	10	"	"	"	50,849					4,055	3,055	173	58,562	
1921.....	10	"	"	"	49,729					4,784	5,356	173	60,569	
1922.....	10	"	"	"	68,818					1,145	24,311	311	94,900	
1922.....	10	"	"	"	66,518					1,145	24,311	311	92,680	
1923.....	10	"	"	"	118,502					1,526	10,057	3,246	133,930	
1923.....	10	"	"	"	112,350					1,526	10,057	3,246	127,778	

NOTE: Figures shown in black are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures in black for years previous to 1918 are actual packs. Figures shown in italic, 1918 to 1923, are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts.

*1914 figures include Rivers Inlet pack only, no figures being available for Smiths Inlet for that year.

NOTE.—Re column "Varieties other than sockeye packed at Smiths Inlet." For the years this column is utilized, figures of the different varieties other than sockeye packed at Smiths Inlet were not available, and had to be shown as a total. Sockeye for these years are shown under their proper heading.

†Statement No. 3 on page 68.

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PACK OF CANNED SALMON ON THE SKEENA RIVER—1876 TO 1923

STATEMENT No. 5

Year	Number of canneries operated	Number of salmon licenses issued				Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Totals
		G.N./Troll.	P.S.	D.S.	T.N.										
1876	1	Particulars not available.				Particulars of varieties not available—practically all sockeye.	"	"	"	"	"	"	"	"	3,000
1877	2	"	"	"	"	"	"	"	"	"	"	"	"	"	8,500
1878	2	"	"	"	"	"	"	"	"	"	"	"	"	"	8,500
1879	2	"	"	"	"	"	"	"	"	"	"	"	"	"	10,603
1880	2	"	"	"	"	"	"	"	"	"	"	"	"	"	19,694
1881	2	"	"	"	"	"	"	"	"	"	"	"	"	"	21,560
1882	2	"	"	"	"	"	"	"	"	"	"	"	"	"	24,522
1883	5	"	"	"	"	"	"	"	"	"	"	"	"	"	31,157
1884	5	"	"	"	"	"	"	"	"	"	"	"	"	"	53,986
1885	2	"	"	"	"	"	"	"	"	"	"	"	"	"	12,900
1886	3	"	"	"	"	"	"	"	"	"	"	"	"	"	37,587
1887	5	"	"	"	"	"	"	"	"	"	"	"	"	"	58,592
1888	5	"	"	"	"	"	"	"	"	"	"	"	"	"	70,106
1889	6	"	"	"	"	"	"	"	"	"	"	"	"	"	58,165
1890	7	"	"	"	"	"	"	"	"	"	"	"	"	"	90,509
1891	7	"	"	"	"	"	"	"	"	"	"	"	"	"	78,135
1892	8	"	"	"	"	"	"	"	"	"	"	"	"	"	90,280
1893	7	"	"	"	"	"	"	"	"	"	"	"	"	"	59,675
1894	7	"	"	"	"	"	"	"	"	"	"	"	"	"	61,151
1895	7	"	"	"	"	"	"	"	"	"	"	"	"	"	67,797
1896	8	"	"	"	"	"	"	"	"	"	"	"	"	"	100,140
1897	8	"	"	"	"	"	"	"	"	"	"	"	"	"	65,905
1898	6	"	"	"	"	"	"	"	"	"	"	"	"	"	81,234
1899	7	"	"	"	"	"	"	"	"	"	"	"	"	"	108,026
1900	10	"	"	"	"	"	"	"	"	"	"	"	"	"	128,529
1901	11	"	"	"	"	"	"	"	"	"	"	"	"	"	126,092
1902	10	"	"	"	"	"	"	"	"	"	"	"	"	"	154,875
1903	10	"	"	"	"	"	"	"	"	"	"	"	"	"	98,669
1904	11	"	"	"	"	93,404	(20,621 Red&Wh.Spr.)					10,315	30,529		154,869
1905	12	"	"	"	"	84,717	(14,598 Red&Wh.Spr.)					7,247	7,523		114,085
1906	14	"	"	"	"	86,394	20,138					16,897	(38,991 Pk.&Ch.)		162,430
1907	13	"	"	"	"	108,413	10,378					15,247	(25,217 Pk.&Ch.)		*159,255
1908	13	"	"	"	"	139,846	13,374		468			10,075	(45,404 Pk.&Ch.)		209,177

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1909.....	12	"	"	87,901	11,727	742	12,249	(28,120	Pk.&Ch.)	140,739
1910.....	12	"	"	187,246	9,546	239	11,531	13,473	222,035
1911.....	12	850	Particulars not available.	131,066	15,514	2,428	23,376	81,956	.....	254,310
1912.....	12	850	"	92,498	19,332	4,501	39,835	97,388	.....	254,258
1913.....	13	850	"	52,927	23,520	3,186	18,647	66,045	.....	164,055
1914.....	13	850	"	130,166	11,529	211	16,378	71,021	.....	237,034
1915.....	13	962	"	116,553	15,069	204	1,798	5,769	.....	279,161
1916.....	14	868	"	60,923	18,372	2,561	3,743	73,029	.....	223,158
1917.....	15	788*	"	65,760	13,586	2,699	1,883	148,319	.....	292,219
1918.....	15	889*	"	123,322	16,013	6,828	4,904	38,456	.....	374,216
1919.....	14	1,153	"	184,945	19,661	2,656	2,672	36,559	.....	398,877
1920.....	15	954	"	90,869	37,403	3,123	1,218	18,068	.....	334,392
1921.....	13	1,109	"	40,018	18,599	445	498	124,457	.....	234,765
1922.....	13	1,091	"	100,615	7,080	1,805	1,050	203,555	.....	362,055
1923.....	13	900	"	131,731	8,863	2,885	3,418	145,973	.....	338,863

* Approximately.

NOTE.—Salmon gill-net figures 1923 include 1 transfer.

15 GEORGE V, A. 1925

PACK OF CANNED SALMON ON THE NAA5 RIVER—1876 TO 1923

STATEMENT No. 6

Year	Number of canneries operated	Number of salmon licenses issued				Sockeye	Red Spring	Pink Spring	White Spring	Blue-backs	Steel-heads	Cohoos	Pinks	Chums	Totals
		G.N.	Troll.	P.S.	D.S.	T.N.									
1876															
1877															
1878															
1879															
1880															
1881	1	Particulars not available.					Particulars of varieties not available—practically all sockeye.								
1882	2	"	"	"	"	"	"	"	"	"	"	"	"	"	7,700
1883	2	"	"	"	"	"	"	"	"	"	"	"	"	"	16,100
1884	1	"	"	"	"	"	"	"	"	"	"	"	"	"	20,383
1885															8,500
1886															
1887															
1888	1	Particulars not available.					Particulars of varieties not available—practically all sockeye.								
1889	3	"	"	"	"	"	"	"	"	"	"	"	"	"	12,318
1890	3	"	"	"	"	"	"	"	"	"	"	"	"	"	19,410
1891	3	"	"	"	"	"	"	"	"	"	"	"	"	"	23,906
1892	3	"	"	"	"	"	"	"	"	"	"	"	"	"	10,323
1893	3	"	"	"	"	"	"	"	"	"	"	"	"	"	25,434
1894	1	"	"	"	"	"	"	"	"	"	"	"	"	"	15,190
1895	1	"	"	"	"	"	"	"	"	"	"	"	"	"	19,587
1896	1	"	"	"	"	"	"	"	"	"	"	"	"	"	19,550
1897	1	"	"	"	"	"	"	"	"	"	"	"	"	"	14,649
1898	1	"	"	"	"	"	"	"	"	"	"	"	"	"	20,847
1899	1	"	"	"	"	"	"	"	"	"	"	"	"	"	18,953
1900	1	"	"	"	"	"	"	"	"	"	"	"	"	"	19,443
1901	1	"	"	"	"	"	"	"	"	"	"	"	"	"	18,238
1902	2	"	"	"	"	"	"	"	"	"	"	"	"	"	14,790
1903	1	"	"	"	"	"	(Other varieties: 2,365)								23,318
1904	2	"	"	"	"	"	Particulars of varieties not available—practically all sockeye.								12,100
							20,953	(2,357	Red and Wh. Spr.)					31	19,085
1905	3	"	"	"	"	"	24,462	(3,340	Red and Wh. Spr.)					1,840	32,725
1906	3	"	"	"	"	"	22,166	858						(3,450 Pk. and Ch.)	32,534
1907	3	"	"	"	"	"	17,813	1,288	63					(5,957 Pk. and Ch.)	31,832
1908	3	"	"	"	"	"	27,584	3,263						(6,612 Pk. and Ch.)	46,908

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1909.....	3	"	"	28,246	2,280	57	6,818	(3,589 Pk. and Ch.)	40,990
1910.....	4	"	Particulars not available.	30,810	1,228	11	6,285	895	39,720
1911.....	3	"	"	37,327	3,434	.....	325	.....	140	7,842	11,467	65,684
1912.....	3	"	"	36,037	5,710	.....	1,226	.....	100	12,468	12,476	71,162
1913.....	3	"	"	23,574	2,999	.....	152	.....	.....	3,172	20,539	53,423
1914.....	4	"	"	31,327	2,660	.....	725	.....	.....	9,276	25,333	25,569
1915.....	4	"	"	39,349	3,053	.....	648	.....	113	15,171	34,879	104,289
1916.....	4	"	"	31,411	3,061	.....	784	.....	1,498	19,139	59,593	126,686
1917.....	4	"	"	22,188	3,170	.....	1,326	.....	1,125	22,180	44,568	119,495
1918.....	6	"	"	21,816	2,332	.....	1,003	.....	1,305	17,060	59,206	143,908
1919.....	5	"	"	28,259	2,408	.....	581	.....	789	10,900	29,949	97,512
1920.....	5	"	"	16,740	3,584	.....	789	.....	560	3,700	43,151	81,153
1921.....	5	"	"	9,364	1,431	.....	220	.....	413	8,236	29,488	51,765
1922.....	5	"	"	31,277	1,466	255	193	3,533	75,687	124,071
1923.....	5	"	"	17,821	2,522	335	595	7,894	44,165	99,580

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PACK OF CANNED SALMON OF PUGET SOUND FROM 1887 TO 1923

STATEMENT No. 3.

Year	No. of canneries operated	Spring	Sockeye	Medium Red	Chum	Pink	Steelhead	Total
1887		Particulars of varieties not available.						22,000
1888	4							21,975
1889	2	240		7,480	1,145	2,890		11,674
1890	1	1,000		3,000	4,000			8,000
1891	2	382	5,538	5,869	3,093	5,647		20,529
1892	2	86	2,954	7,206	16,180			26,426
1893	3	1,200	47,852	11,812	11,380	17,530		89,331
1894	3		41,781	22,418	22,152	9,049		95,400
1895	7	1,542	65,143	50,865	38,785	23,633		179,968
1896	11	13,495	72,979	82,640	26,550			196,664
1897	12	9,500	312,048	91,900	23,310	57,268		494,026
1898	18	11,200	252,000	98,600	38,400			400,200
1899	19	24,364	499,646	111,387	31,481	252,733		919,611
1900	19	22,350	229,800	128,200	89,100			469,450
1901		Particulars of varieties not available.						1,380,590
1902	21	30,049	372,301	85,817	93,492			581,659
1903	22	14,500	167,211	103,450	12,001	181,236		478,488
1904	13	14,441	109,264	118,127	49,656			291,488
1905	24	1,804	825,453	79,335	41,057	70,992		1,018,641
1906	16	8,139	178,748	94,497	149,218			430,602
1907	14	1,814	93,122	119,372	50,249	433,423		698,080
1908	22	95,210	170,951	128,922	47,607	6,075		448,765
1909	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910	24	10,064	248,014	162,755	146,942	108		1,567,883
1911	15	21,823	127,761	256,124	104,321	1,046,982		1,557,029
1912	20	20,252	184,680	149,727	60,760	700		416,125
1913	22	1,234	1,673,059	61,019	56,225	791,886		2,583,463
1914	31	26,044	335,230	151,893	278,801	892		792,860
1915	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916	32	37,030	84,637	155,832	427,878	1,887		707,278
1917	45	57,543	411,538	114,276	216,285	1,124,884		1,921,554
1918	32	63,366	50,723	235,860	267,538	6,605	106	624,198
1919	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,626
1920	11	25,846	62,654	24,502	48,849	4,669		166,520
1921	23	25,567	102,967	89,412	30,831	404,713		653,490
1922	16	20,615	48,566	111,711	65,552	2,225		248,729
1923	18	15,777	47,402	122,000	97,081	475,849	29	758,138

COMPARATIVE STATEMENT OF FISHERY LICENSES ISSUED, SEASONS 1923 AND 1922

SUMMARY—WHOLE PROVINCE OF BRITISH COLUMBIA. As at February 16, 1924.

STATEMENT No. 7.

[illegible]

STATEMENT SHOWING INCREASE OR DECREASE IN LICENSES ISSUED IN 1923 OVER LICENSES ISSUED IN 1922,
BRITISH COLUMBIA

STATEMENT No. 8

Variety of License	Area	Licenses issued 1923				Increase over 1922			Decrease from 1922			Totals All nationalities	
		Whs.	Ind.	Jap.	Total	Whs.	Ind.	Jap.	Whs.	Ind.	Jap.	Net In- crease	Net De- crease
Salmon Gill-net.....	Whole province..... Percentage.....	1,642	1,122	1,193	3,957	172 9.5	90 7.4				796 40.0		534 11.9
"	District No. 1..... Percentage.....	414	27	523	964	24 6.2				7 20.6	349 40.0		332 25.6
"	District No. 2— Naas River..... Percentage.....	33	116	95	244	1 3.1	2 1.7				63 39.9		60 19.7
"	Skeena River..... Percentage.....	178	337	385	900	19 11.9	47 16.2				257 40.0		191 17.5
"	Rivers Inlet and Smiths Inlet..... Percentage.....	614	463	95	1,172	47 8.3				4 0.9	62 39.5		19 1.6
"	Outlying..... Percentage.....	349	120	66	535	114 48.5	41 51.9				45 40.5	110 25.9	
"	Totals— District No. 2..... Percentage.....	1,174	1,036	641	2,851	181 18.2	86 9.1				427 40.0		160 5.3
"	District No. 3..... Percentage.....	54	59	29	142		11 22.9		33 37.9		20 40.9		42 22.8
Salmon Trolling.....	Whole province..... Percentage.....	698	499	249	1,446		61 13.9		45 6.1		83 25.0		67 4.4
"	District No. 1..... Percentage.....	25			25	8 47.1						8 47.1	
"	District No. 2..... Percentage.....	162	104	1	267				140 46.4	5 4.6	1 50.0		146 35.3

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"	District No. 3— East coast.....	336	139	104	579	138 69.7	108 343.4					34 24.7	212 57.8
"	West coast.....	175	256	144	575				51 22.6	42 14.1	48 25.0		141 19.7
"	Totals— District No. 3.....	511	395	248	1,154	87 20.5	66 20.1				82 25.0	71 6.6	.....	.....
Boat.....	Whole province.....	74	6	96	176				3 3.9		69 41.9		72 29.0	.....
Buyers.....	Whole province.....	132	5	25	162	47 55.3	5 Inf.				16 39.0	36 28.6	.....	.....

APPENDIX 2

FISHERIES

FINANCIAL STATEMENT, 1923-24

Vote No.	Service	Appropriation		Expenditure	
		\$	cts.	\$	cts.
249	Salaries and disbursements of Fishery Officers, Fisheries Patrol Service, Fisheries Protection Service.....	880,000	00	807,189	08
250	Building fishways and clearing rivers.....	40,000	00	20,316	45
251	Legal and incidental expenses.....	4,000	00	656	16
252	Conservation and development of deep-sea fisheries.....	95,000	00	19,864	30
253	Fisheries Intelligence Bureau.....	2,000	00	958	19
254	Inspection of canned and pickled fish.....	25,000	00	23,122	99
255	Fish culture.....	370,000	00	350,487	34
256	Investigations into fisheries.....	15,000	00	5,553	28
257	Marine Biological Board.....	42,000	00	42,000	00
		1,473,000	00	1,270,147	79
	Civil Government salaries.....	99,820	00	93,521	58
	Contingencies.....	20,000	00	18,352	02
	Fishing bounty.....	160,000	00	159,916	80
		1,752,820	00	1,541,938	19
435	Cost of Living Bonus.....			58,618	51
	Superannuation No. 4, Retirement Act, 1920.....			5,456	95
	Gratuities.....			230	00
	Total net expenditure, 1923-24.....			1,606,243	65

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STATEMENT OF REVENUE RECEIVED DURING THE FISCAL YEAR 1923-24

[illegible]

SESSIONAL PAPER No. 29

SUMMARY

General Account.....	102,511 54	21,092 01	19,180 50	2,550 23	1,142 62	1,538 52	51,415 92	960 50	20,455 77	20,455 77
Eastern Division.....									1,222 49	201,614 33
Quebec.....	25,748 11	10,147 08	225 00	406 25	1,552 08		1,707 50	2,071 45	282 90	201,282 90
Central Division.....	55,835 20	20,712 71				304 64	15,324 30	3,671 71	443 69	42,301 16
British Columbia.....									8,142 04	103,990 60
	184,094 85	51,951 80	19,405 50	2,956 48	2,694 70	1,843 16	68,447 72	6,703 66	30,546 89	368,644 76

DETAILED STATEMENT FISHERIES PATROL SERVICE EXPENDITURE, 1923-24

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel \$ cts.	Repairs		Supplies			Clothing \$ cts.	Sundry		Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.	Stewards \$ cts.		\$ cts.	\$ cts.	
<i>Eastern Division—</i>												
<i>Nona Scotia</i>												
"Mildred McColl"	3,519 93	2 10	1,130 26	136 01	65 44	238 58	54 33	48 82	2 68	71 05	5,269 20	8,699 93
"A"	2,105 87	29 78	441 99	62 66	415 87	85 56	52 72	65 07		16 21	3,275 73	
"B"										5 00	5 00	
"E"										150 00	150 00	
<i>Prince Edward Island</i>												
"Ostrea"				151 70		58 23		1 30		304 80	516 03	1,590 55
"D"										25 00	25 00	
"Richmond"	779 58		105 00		8 67	43 99	72 08	0 39		39 81	1,049 52	
<i>New Brunswick</i>												
"Togo" (chartered boat)	1,505 00		423 83			37 68	4 70	21 00		351 66	2,343 87	12,602 99
"C"	1,657 62	9 75	414 89	461 13	59 32	117 82	23 55	6 13		2,492 61	2,992 61	
"C"										43 07	43 07	
"Phalarope"	3,838 77		913 97	89 91	138 80	200 53	58 97	85 70	38 07	19 42	5,384 14	
"Shannon"	1,075 00		234 86	0 96			10 78			202 60	1,524 20	
"Vendetta"			20 05	163 00	41 05					91 00	315 10	
<i>Central Division—</i>												
"Bradbury"	14,481 77	41 63	3,684 85	1,065 37	729 15	782 39	277 13	228 41	40 75	1,562 02		22,893 47
<i>British Columbia Division—</i>												
General account	9,896 33	2,647 83	5,748 98	3 19		239 38	791 12	182 98	354 79	186 65		20,051 25
Digby Island Shop	140 00		302 18	5 90	250 00	3 25	32 03	3 57	8 86	12,369 74		13,115 53
Sapperton Warehouse	3,027 50		32 55					2 19		152 55		3,214 79
	2,520 00		79 98			93 00		9 20	31 50	6 00		2,739 68
<i>Chartered Boats</i>												
"Akashi"	926 21		357 72			50 75				1,270 00	2,604 68	66,757 00
"Annie C."	733 07		70 58			5 99		4 16		497 85	1,311 65	
"Aramac"	364 94		76 00			55 00				108 00	603 94	
"Bluebird"	316 67		76 00			6 50		0 50		98 00	498 27	
"Clare"	345 00		83 56			6 49		1 58		368 00	804 63	
"Corycia"	123 33		39 18			3 90		2 10		39 00	207 51	
"Dustie"	578 71		103 41			14 34		1 54		770 00	1,471 40	
"Elk"			61 79			18 08				138 00	219 41	
"Elkhart"	899 77		126 29			25 08				526 00	1,577 14	
"Esperanza"	720 00		337 50			51 95				219 00	1,328 45	
"Flier"	248 71		9 00							42 00	299 71	

DETAILED STATEMENT FISHERIES PATROL SERVICE EXPENDITURE, 1923-24—Concluded

Establishments and Accounts	Paylist	Board or Prov'n.	Fuel	Repairs		Supplies		Clothing	Sundry	—	Total
				Hull	Engine	Engine	Deck				
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>British Columbia Division—Con.</i>											
<i>Departmental Boats—Con.</i>											
"Cohoe".....	718 95		302 48	254 22	355 14	99 81	16 73		118 54	1 936 05	
"Egret".....	1,500 00		240 27	564 61	935 84	2,082 64	41 25		94 00	5,608 76	
"Elk".....	2,804 52		543 85	217 20	124 02	72 40	0 50		5 65	3,790 68	
"Elsa".....	55 00		71 38			81 71	5 80	4 29	565 26	786 52	
"Foam".....	5,040 00		755 36	306 38	387 42	75 51	193 09		230 02	7 018 48	
"Givenchy".....	25,755 16	7,023 49	11,582 39	3,448 56	1,730 70	1,231 48	701 15	1,659 74	915 40	55,688 13	
"Gull".....	944 84		572 15	561 51	421 74	57 05	33 25	61 51	122 62	2,774 67	
"Hawk".....	1,601 01		693 50	240 32	22 69	121 42	18 70	50 36	14 00	2,762 00	
"Heron".....	1,399 10		403 92	305 03	75 67	54 93	30 60	20 00	35 80	2,325 05	
"Humming Bird".....			5 17		1 65	6 38			13 20		
"Kayex".....				7 51	28 33				81 00	116 84	
"Linnett".....	1,497 02		524 63	190 55	25 75	104 29	52 60		67 55	2,485 80	
"Marfish".....	6,394 66	1,613 52	1,873 73	2,546 52	502 51	265 71	117 95	307 13	498 57	14,279 11	
"Merlin".....	1,234 51		390 10	736 15	50 16	86 13	38 92	19 63	53 40	2,609 00	
"Merrysea".....	4,650 65		1,169 19	46 77	1,096 50	121 72	53 85	85 72	145 25	7,369 65	
"Piarmigan".....				2 30			1 00			3 30	
"Revidis".....					341 43	288 43			1 52	631 38	
"Semihamo".....	1,800 00		19 81		10 52	8 34			14 89	1,956 66	
"Swan".....	4,740 00		777 85	215 13	967 55	59 66	13 70	24 88	3 79	6,846 28	
"Vandis".....					341 44	288 44			14 85	647 51	
"Vedder".....	1,350 00		199 10	1,631 91	210 10	1,849 70	180 94	297 46	108 62	5,836 57	
General Account.....	101,854 29	9,263 05	31,677 06	17,336 80	9,858 49	11,149 24	1,629 02	3,136 56	42,475 70		230,312 37
						11,953 00			2 58		11,955 58
SUMMARY											
Eastern Division.....	14,481 77	41 63	3,684 85	1,065 37	729 15	782 39	277 13	228 41	40 75	1,562 02	22,893 47
Central Division.....	9,896 33	2,647 83	5,748 98	3 19		239 38	791 12	152 98	354 79	186 65	20,051 25
British Columbia Division.....	101,854 29	9,263 05	31,677 06	17,336 80	9,858 49	11,149 24	1,629 02	3,136 56	1,932 16	42,475 70	230,312 37
General Account.....	126,232 39	11,952 51	41,110 89	18,405 36	10,587 64	24,124 01	2,697 27	3,547 95	2,327 70	44,226 95	285,212 67

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FISHERIES

DETAILED STATEMENT FISH CULTURE EXPENDITURE, 1923-24

Hatcheries	Salaries	Mainten- ance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia—</i>				
Bedford.....	1,260 00	15,217 47	16,477 47	
Lindloff.....		1,119 55	1,119 55	
Margaree.....	3,600 00	4,212 52	7,812 52	
Margaree Pond.....		4,641 57	4,641 57	
Middleton.....	2,460 00	5,761 75	8,221 75	
Windsor.....	1,320 00	2,802 17	4,122 17	
	8,640 00	33,755 03		42,395 03
<i>Prince Edward Island—</i>				
Kelly's Pond.....	2,640 00	2,219 03	4,859 03	4,859 03
<i>New Brunswick—</i>				
Grand Falls.....	2,482 67	2,809 02	5,291 69	
Miramichi.....	2,940 00	2,254 88	5,194 88	
Miramichi Pond.....		3,768 57	3,768 57	
Nepisiquit.....		482 24	482 24	
New Mills Pond.....	380 00	4,455 60	4,835 60	
Restigouche.....	2,820 00	3,199 20	6,019 20	
Sparkle.....		547 98	547 98	
St. John.....	2,947 67	3,785 80	6,733 47	
St. John Pond.....		7,783 14	7,783 14	
Tobique.....		213 34	213 34	
	11,570 34	29,299 77		40,870 11
<i>Ontario—</i>				
Collingwood.....	3,390 00	9,299 83	12,689 83	
Kenora.....	4,051 00	9,348 27	13,399 27	
Kingsville.....	3,472 50	4,932 60	8,405 10	
Port Arthur.....	4,398 00	2,579 68	6,977 68	
Sarnia.....	3,900 00	4,832 66	8,732 66	
Southampton.....	3,270 00	3,922 89	7,192 89	
Thurlow.....	5,025 00	12,963 44	17,988 44	
Wiarton.....	3,884 48	4,910 52	8,795 00	
	31,390 98	52,789 89		84,180 87
<i>Manitoba—</i>				
Dauphin River.....	2,655 00	4,506 42	7,161 42	
Dauphin River Spawn Camp.....		1,100 64	1,100 64	
Gull Harbour.....	1,680 00	5,076 13	6,756 13	
Winnipegosis.....	2,125 00	11,286 70	13,411 70	
	6,460 00	21,969 89		28,429 89
<i>Alberta—</i>				
Banff.....	2,405 32	2,834 69	5,240 01	
Spray Lakes.....	39 84	1,139 31	1,179 15	
	2,445 16	3,974 00		6,419 16
<i>Saskatchewan—</i>				
Qu'Appelle.....	2,289 84	4,691 54	6,981 38	6,981 38

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DETAILED STATEMENT FISH CULTURE EXPENDITURE, 1923-24—*Concluded*

Hatcheries	Salaries		Maintenance		Total of hatchery		Total of provinces	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>British Columbia—</i>								
General Account.....	6,987	81	4,539	16	11,526	97		
Anderson.....	1,279	35	7,091	57	8,370	92		
Babine.....	810	00	8,089	80	8,899	80		
Cowichan.....	927	91	5,784	73	6,712	64		
Cranbrook Eyeing Station.....			77	05	77	05		
Cultus.....	532	91	5,322	87	5,855	78		
Gerrard.....			3,399	45	3,399	45		
Harrison.....	2,361	77	7,857	21	10,218	98		
Kennedy.....	1,301	81	5,731	41	7,033	22		
Lloyd's Creek Eyeing Station.....	85	00	1,246	63	1,331	63		
Nelson Eyeing Station.....	840	00	2,585	56	3,425	56		
New Westminster.....			0	70	0	70		
Pemberton.....	2,042	74	11,304	38	13,347	12		
Pitt.....	510	00	7,346	35	7,856	35		
Rivers Inlet.....	1,659	00	16,212	83	17,871	83		
Skeena.....	482	74	9,702	38	10,185	12		
Stuart.....	720	00	4,349	71	5,069	71		
	20,541	04	100,641	79	.....		121,182	83
<i>General Account.....</i>								
	5,500	00	9,669	04	15,169	04	15,169	04
	91,477	36	259,009	98	.....		350,487	34

SUMMARY

Nova Scotia.....	8,640	00	33,755	03		42,395 03
Prince Edward Island.....	2,640	00	2,219	03		4,859 03
New Brunswick.....	11,570	34	29,299	77		40,870 11
Ontario.....	31,390	98	52,789	89		84,180 87
Manitoba.....	6,460	00	21,969	89		28,429 89
Alberta.....	2,445	16	3,974	00		6,419 16
Saskatchewan.....	2,289	84	4,691	54		6,981 38
British Columbia.....	20,541	04	100,641	79		121,182 83
General Account.....	5,500	00	9,669	04		15,169 04
	91,477	36	259,009	98		350,487 34

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FISHERIES
DETAILED STATEMENT FISHERIES PROTECTION SERVICE EXPENDITURE, 1923-24

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel \$ cts.	Repairs		Supplies		Clothing \$ cts.	Sundry \$ cts.	— \$ cts.	Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.				
<i>Eastern Division—</i>											
“Arleau”	18,490 55	4,880 92	7,691 77	4,437 07	281 40	756 55	509 41	873 54	834 89	39,258 25	
“Arras”	20,459 38	5,451 31	9,836 06	2,782 44	2,661 38	1,029 79	350 72	781 68	1,197 71	44,878 10	84,136 35
	38,949 93	10,332 23	17,527 83	7,269 51	2,942 78	1,786 34	860 13	1,655 22	2,032 60		84,136 35
<i>Great Lakes—</i>											
“Becancour”										23 00	23 00
“Lavolette”			320 62						12 00	332 62	355 62
			320 62						35 00		355 62
<i>Western Division—</i>											
“Malaspina”	30,012 84	7,218 29	13,672 72	2,933 10	2,066 34	928 08	646 50	1,524 61	1,088 13	61,483 34	
“Thiepval”	1,942 58	729 38	1,445 70	264 37	267 41	278 06	213 74	288 22	144 65	5,804 48	67,287 82
	31,955 42	7,947 67	15,118 42	3,197 47	2,333 75	1,206 14	860 24	1,812 83	1,232 78		67,287 82
General Account								1,345 69	206 17		1,551 86
SUMMARY											
Eastern Division	38,949 93	10,332 23	17,527 83	7,269 51	2,942 78	1,786 34	860 13	1,655 22	2,032 60		84,136 35
Great Lakes			320 62						35 00		355 62
Western Division	31,955 42	7,947 67	15,118 42	3,197 47	2,333 75	1,206 14	860 24	1,812 83	1,232 78		67,287 82
General Account								1,345 69	206 17		1,551 86
	70,905 35	18,279 90	32,966 87	10,466 98	5,276 53	2,992 48	1,720 37	4,813 74	3,506 55		153,331 05

APPENDIX 3

REPORT ON FISHWAYS AND REMOVAL OF OBSTRUCTIONS FOR
YEAR ENDING DECEMBER 31, 1923, BY CHAS. BRUCE,
FISHERIES ENGINEER

The spring of 1923 was a particularly unfortunate one as regards fishways, owing to heavy freshets. In some instances structures that had been in operation for a number of years, as well as the dams in which they were installed, were either seriously damaged or broken down entirely.

The following dams in the Maritime Provinces were inspected by the fisheries engineer during the year:—

SALMON RIVER, VICTORIA COUNTY, N.B.

- (a) Joseph Cote—Saw-mill dam.
- (b) Terrialt—Grist-mill dam.
- (c) Davis Lumber Company—Saw-mill dam.
- (d) Davis Lumber Company—Storage dam.

The necessary surveys were made at each of these dams, and plans and specifications prepared from which fishways will be installed in 1924.

NASHWAAK RIVER, YORK COUNTY, N.B.

- (a) Nashwaak Pulp and Paper Company—Dam at Marysville.

Freshets had almost completely destroyed this fishway, and it was necessary to rebuild it. As conditions for the ascent of fish had never been satisfactory, it was decided to build the new fishway at another location in the dam. Plans and specifications were prepared and arrangements made with the company for the construction, which was completed in October.

BECAQUIMEC RIVER, CARLETON COUNTY, N.B.

- (a) The dam and fishway owned by the Sayre Lumber Company at Hartland were seriously damaged by the freshets in the spring. Repairs were effected by the company during the summer.

ST. CROIX RIVER, YORK COUNTY, N.B.

- (a) A low dam at the foot of Grand lake, owned by the St. Croix Pulp and Paper Company, was inspected. The fishway which is situated on the Canadian side of the international boundary was found to be entirely out of commission, the materials of which it was built being rotted away.

It is considered that a suitable fishway in the form of a ditch could be constructed with not greater expense and certainly more permanency on the American side of the dam. The Commissioner of Fisheries for the State of Maine was communicated with, requesting him to take the matter up as it is outside of the jurisdiction of this department. The dam in question prevents the passage of land-locked salmon which are in the river in quite large numbers.

- (b) The International Joint Commission rendered its decision requiring that the St. Croix Gas and Electric Light Company, and the Canadian Cottons Limited, owners of dams on the river at or near St. Stephen, to build fishways therein, from plans approved by both the American and Canadian Fisheries Departments.

MIRAMICHI RIVER, NORTHUMBERLAND COUNTY, N.B.

(a) Provision was made to have the owners build a fishway in a low dam on the Taxes river, a tributary stream entering the southwest Miramichi river at Boisetown.

(b) An examination was made of the dam on the Bartholomew river, a tributary to the southwest Miramichi, to determine if a fishway should be built therein. On account of the unfavourable reports of this river for spawning purposes, it was decided that a fishway should not be required.

GRAND RIVER FALLS, RICHMOND COUNTY, N.S.

A fishway was built over these falls a number of years ago which has since fallen into disuse. A survey of the structure was made and information obtained from which reconstruction will be carried out next year when water conditions are suitable.

SHEET HARBOUR RIVER, HALIFAX COUNTY, N.S.

The conditions for the construction of a fishway in the dam under construction by the Nova Scotia Hydro-Electric Commission were examined. There appears a fairly favourable opportunity for a partially natural fishway over the falls with some construction to get by the dam. The commission's engineer was interviewed and the situation fully discussed with him. Arrangements were made to have the fishway built, but its efficiency will be a matter to be determined after the power plant is in operation.

LAWRENCETOWN RIVER, HALIFAX COUNTY, N.S.

The old dam between Echo lake and lake Martin on the above river was removed providing a free passage for fish.

MUSHAMUSH RIVER, LUNENBURG COUNTY, N.S.

A set of revolving paddles was placed in the tailrace from the power house of the hydro-electric station. This was done with a view to preventing the ascent to salmon up the tailrace canal, and to direct them into the fishway.

Construction was completed too late in the season to determine the efficiency of this work, but it will be followed closely during the run of salmon next season.

MEDWAY RIVER, LIVERPOOL COUNTY, N.S.

Some repairs were carried out at the fishway in the pulp mill dam at Salters falls to remedy breaks that had occurred in the walls of the fishway. Reports show that this fishway was satisfactorily operated during the past season, both salmon and alewives ascending the river in numbers.

MERSEY RIVER, LIVERPOOL COUNTY, N.S.

Extensive construction was done on all the fishways on this river.

In the first dam a large fishway was built at the westerly end.

In the second dam a somewhat similar fishway was built at the easterly end.

The existing fishway in the third dam was enlarged, and the partitions rebuilt with a view to providing deeper water and easy runs between the pools.

The existing fishway in the fourth dam was extended further into the river with a view to making access easier during low water. The pool into which

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the fishway discharges was also improved by closing the openings in a ledge of rock below the dam and directing the flow through one main channel.

The existing fishway in the fifth dam was enlarged and extended further into the river with a view to making access easier during low water.

All work in connection with the above fishways was constructed in stone and concrete in order to assure permanency.

CLYDE RIVER, SHELBURNE COUNTY, N.S.

A new fishway was built in the pulp company's dam on the Clyde river at Queens, to replace the one destroyed by ice during the spring freshets.

JORDAN RIVER, SHELBURNE COUNTY, N.S.

A survey was made of the second dam on the river where the old fishway was destroyed by freshets. Plans will be prepared for a new fishway, and construction will be carried out next season.

ROUND BAY RIVER, SHELBURNE COUNTY, N.S.

In response to a petition from local residents urging that a new channel through the beach would greatly improve the passage for fish, a survey of the situation was made.

The result of this survey showed that in so far as the fisheries are concerned the present channel is adequate. As the greatest damage from the changed conditions, due to the shifting of the river's mouth, was to the lands behind the beach which had been submerged to the extent of a number of acres thereby, it was considered that any action looking to improvements would be a matter for the consideration of the Department of Public Works and recommendation was made accordingly.

In the province of Manitoba, where conditions for the ascent of fish at a number of dams were complained of, an inspection was made by an engineer from the department. The fishways have been built largely on ideas of the Inspectors and Overseers, and in some instances are entirely unsuitable for the varieties of fish using them.

Owing to the pressure of work the engineering staff was unable to give the renewal of any of these fishways attention during the low water of last summer.

As, however, the attention of the department was directed particularly to those on the Whitemud river, the repair of these is being undertaken during low water this winter.

Numbers of requests for information regarding fishway construction were received from private individuals as well as from the Newfoundland Government. As complete information as possible, in the light of the department's experience, was furnished to all inquiries.

The practice of receiving monthly reports on the condition of fishways in their districts from fishery overseers has been continued, thus keeping the department in touch with their operation.

Appended hereto is a copy of the report by the Resident Engineer McHugh for the British Columbia Division, covering the work performed during the year ending December 31, 1923.

BRITISH COLUMBIA

(1) REMOVAL OF OBSTRUCTIONS

The various streams from which obstructions have been removed, and the expenditure involved in each case during the year are detailed as follows:—

Deer Passage Creek, Bella Bella District, \$500.—Removal of debris left in stream bed after discontinuance of logging operations, and concentration of reduced summer flow to a single channel.

Gullechuck, Bella Bella District, \$536.—Easing the ascent of a fall approximately 10 feet in height by the blasting of pockets or pools.

Tinkev Creek, Bella Bella District, \$410.—Continuance of the work commenced in the previous year for the purpose of easing the ascent of salmon over numerous rock ledges at low water periods.

Kisimete River, Bella Bella District, \$1,572.—Continuance of the work commenced in the previous year for the purpose of easing the ascent of salmon over falls. Several falls exist in the bed of this stream, one being 12 feet in height.

Kiltik Creek, Bella Bella District, \$125.67.—The removal of a jam of spruce roots and logs which effectually closed the mouth of this stream.

Thurston Bay Creek, Upper Valdez Island, \$768.21.—Removal of debris deposited in the stream bed by loggers, and the blasting of boulders and ledge rock to facilitate the ascent of salmon.

Puntledge River, Vancouver Island, \$492.65.—The continuance of the work commenced in the previous year for the purpose of confining the stream, in sections, to a central channel. A large proportion of the volume of this stream, during summer flow, is taken for power development in connection with the works of the Canadian Collieries, Limited. This water is taken from the river at a point approximately half a mile below Comox lake and is returned to the river after running through the turbines some distance below. Portions of the river lying between these two points are of extreme width, and the bed thereof consists of ledges of shelving rock, which, during low water periods, can be crossed without wetting the feet. The excavation of channels for the concentration of water, particularly where abrupt falls exist, then becomes necessary, and it is work of this nature which has in the past been the cause of expenditure on this stream.

Now that the impounding dam at the foot of Comox lake has been rendered passable to salmon by the construction of a fishway in the dam, more work of similar nature on this stream may become necessary from time to time, as the runs of salmon to the lake gradually increase.

This will be more than ever necessary should there be good returns in due time from the planting of sockeye eggs in the Cruikshank river, draining into Comox lake.

Demanuel Creek, Sooke Harbour District, \$237.—Removal of a log jam in the stream bed which effectually held up the passage of salmon to the waters beyond. This work was successfully performed at very little cost, under contract, and salmon are now able to continue their way unmolested to the upper waters.

Kakweiken River, Alert Bay District, \$634.70.—Continuance of the work of easement of the falls located in the bed of this stream performed under the supervision of the overseer of the Alert Bay district, who remarks in his reports upon the efficiency of the work performed.

Owens Bay, Okishollow Channel, Quathiaski District, \$207.75.—The removal of debris let in the stream bed by loggers, and which effectively closed the stream to the further ascent of salmon.

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In addition to the above are several smaller expenditures, as detailed below, each amounting to less than \$100, which have been incurred in various parts of the province and performed under the supervision of the local overseers or guardians. In the majority of these cases the work is straight-forward, requiring nothing but diligent labour in its execution, and unless one of the engineers happens to be in the vicinity at the time such work is being done, it is not generally considered necessary to incur the expense of making a special visit to the ground. The overseer's report being in such circumstances accepted.

Lardeau river.....	\$65 71
Skutz falls.....	5 40
Cameleon Harbour creek.....	55 00
Heydon Bay creek.....	55 00
Quatsi river.....	27 00
Embley lagoon.....	55 00
Little river.....	22 50
Rivers Inlet district.....	45 96

(2) CONSTRUCTION AND MAINTENANCE OF FISHWAYS

Repairs to Meziaden River Fishway, \$6,999.38.—This expenditure was incurred owing to the necessity of reconditioning the fish ladder at this point, through which salmon pass on their journey to the spawning grounds on Meziaden lake (headwaters Naas river).

The fishway was constructed under the supervision of the Public Works Department of the provincial government for this department, ten years ago, and consists of an open cut in the bank of the Meziaden river adjacent to the big falls, through a strata of rock which is overlaid by a heavy bank, some 50 feet high, of hard-pan, gravel and soft sand. At the time of construction this soft material was intended to be held in place by the construction of a facing of logs supporting the hard-pan strata adjoining the rock, having log stretchers penetrating the bank to hold the logs in place.

In the course of time some of these logs began to show signs of rot and commenced to bulge badly in the centre, quantities of soft material from above sliding over the bank and into the fish ladder. Whilst a great proportion of this material was carried away safely by the velocity of the water flowing through the fish ladder, yet a proportion of the boulders which were incorporated therein remained in the fishway, gradually filling the pockets.

In the fall of 1918 it became necessary to insert timber struts to support this skeleton log crib, and since that year further struts have been added from time to time. The necessity for the rebuilding of a more or less permanent structure around the base of this soft material became more apparent each year, until arrangements were completed during the year under review for the work to be done. Three alternative plans, varying in estimated cost, were placed before the department, and it was finally left to the judgment of the engineer in charge to adopt whichever scheme seemed most suitable after arriving on the ground in the spring.

The work was commenced early in June of 1923. All struts and old facing logs were first removed, and approximately 1,000 yards of soft material excavated, and sluiced down the stream, and an entirely new double crib, 120 feet in length and 8 feet in width, and varying from 8 feet to 14 feet in height, was constructed of green sound peeled jack pine. This was loaded with rock, brush and gravel and securely anchored to a solid rock foundation 10 feet wide, both front and rear, with split iron keys. The upper bank was then trimmed to a uniform slope and the excess material disposed of. By the construction of a temporary dam at the mouth of the fishway, the water from the fishway was diverted to the river and all pockets were entirely cleaned of their debris.

This whole work was accomplished under an expenditure of \$500 less than the estimated cost and can be considered as permanent since the life of the crib is conservatively placed at twenty-five years. It might be added that the difficulties of transportation in this part of the country added considerably to the cost of this work, material and supplies having to be taken in over pack-horse trails at heavy expense.

Special trips were made during the year to the following points for the purpose of investigating conditions on streams which had been reported to contain obstructions to the free ascent of salmon: Smiths inlet; Hemming bay (Quathiaski district); Owekano lake (Rivers Inlet district); Nahatlatch river (Fraser River district); Quay river (Bella Bella district); Hells gate (Fraser River district).

The preparation of reports and sketches covering the details thereof where necessary followed immediately on these examinations for further consideration by the department.

APPENDIX 4

REPORTS ON THE C.G.S. "ARLEUX" AND C.G.S. "ARRAS"

REPORT OF CAPTAIN WM. J. MILNE, OF THE "ARLEUX," FOR 1923

The *Arleux* was outfitted and made ready for sea during the first part of April.

On the 22nd she proceeded to the assistance of a French trawler ashore on Thrumcap shoal but did not succeed in refloating her. She then proceeded westward.

May 8, patrolling the bay of Fundy where a large number of craft were fishing for lobsters and scallops off the Digby shore. Quantities of lobsters, under the legal size, which had been caught and concealed were located. On the New Brunswick coast all fish, except gaspereaux, were scarce.

Proceeded to the south shore of Nova Scotia on May 18 to watch the American seiners.

On May 25 we cruised westward, off Sambro, with a large fleet of United States seiners composed of schooners, trawlers and small steamers.

On June 25 the *Arleux* towed a disabled fishing craft into Lunenburg harbour, then went to the assistance of a fishing schooner ashore in that harbour and towed her afloat.

We then proceeded to the bay of Fundy and saw several craft scallop fishing outside of territorial waters. These boats were making good catches. We patrolled the bay searching the shores for illegal lobster fishing and other breaches of the law.

Arrived in Halifax, after patrolling the Atlantic coast, on July 21 to have the boiler welded and prepare for a cruise under the direction of the Biological Board.

On August 3 Dr. Huntsman and party came on board and we proceeded to cruise taking plankton observations, tidal surveys, etc., off the coasts of Nova Scotia, Labrador and Newfoundland. These observations were completed on the 21st of September and we proceeded to St. Andrews calling at Canso, Halifax and Lockeport on the way.

We reached St. Andrews on September 26, and landed the Biological officers and their apparatus, and then proceeded to fisheries protection duty, patrolling the bay of Fundy, watching the scallop fishermen and sardine carriers and searching for new scallop beds.

On October 13 off Briar island we proceeded to the assistance of the *Aberdeen* ashore on Seal island

We assisted in the international fishing schooner race off Halifax on October 30 and then followed the fall fleet of American seiners. The latter left for home on November 12.

We then proceeded to the entrance to the bay of Fundy and found a new scallop bed off the Lurcher.

Returning to the Atlantic coast and watching American fishermen until December 7, when we proceeded to Canso to assist the fleet of small vessels and boats fishing out of that port.

Haddock fishing was continued until January 30 out of Canso, the latest date recorded at that point.

On February 5 the *Arleux* was placed in winter quarters at Lunenburg.

GENERAL

During the season the shores of the western district were searched for illegal lobster fishing. Fewer instances of this were found than in the previous year.

Good catches of scallops were made by boats fishing outside of territorial waters during the close season in the bay of Fundy. We steamed amongst these boats keeping them the required distance from shore.

Sardines were scarce, especially late in the year off the New Brunswick shores. A number of lobster fishermen in the western part of Nova Scotia depend on the fall run of sardines for their lobster bait. Should this supply prove inadequate bait could be obtained by sending craft to Browns Bank to seine or net herring in the early spring as numerous herring schools are located there then.

The *Arleux* steamed 13,621 miles, and was under weigh 1,700 hours during the season.

REPORT OF CAPT. C. BARKHOUSE, OF THE *Arras* ON THE MACKEREL SCOUTING
DURING THE SPRING OF 1923

- May 13.—*Arras* has located mackerel 25 miles south of cape Sable. The fish are approaching the coast from the southwest. Will endeavour to follow movements of fish to-night.
- May 13.—*Arras* on mackerel scouting duties noon. Position fifteen miles south cape Roseway. No mackerel sighted yet but prospect good. Mackerel feed showing on water. Weather moderate. Southwest wind with heavy south swell.
- May 14.—*Arras* position 8 p.m. 10 miles south cape Negro on scouting duties.
- May 15.—*Arras* at Shelburne. Weather unfit for scouting and returned to harbour. Will proceed soon as weather clears.
- May 16.—Twenty miles southeast of cape Sable. Increasing south winds and overcast. Returning to Sand point until weather clears. No fish sighted.
- May 17.—*Arras* at Shelburne. Dense fog on coast. Will proceed scouting soon as weather clears.
- May 18.—*Arras* position 2 p.m. to-day, 25 miles south southwest cape Sable. Weather fine. Good prospects for mackerel.
- May 19.—*Arras* position noon to-day, 40 miles southeast by south from cape Sable. Have located large body of mackerel between Browns and Little LaHave banks. These fish are moving slowly northeast towards coast Nova Scotia.
- May 20.—*Arras* position 10 a.m. western side of Roseway bank. Increasing easterly winds. Unfit for scouting work. Proceeding to Shelburne.
- May 21.—*Arras* at Shelburne. Weather unfit for scouting. Proceeding when weather moderates.
- May 22.—*Arras* position noon 18 miles southeast cape Negro. Small lots of mackerel showing, going east. Spoke Lockeport netter Grace MacKay and reported taking 30 large mackerel last night. Also netter Nellie Banks of Lockeport reported 11 large mackerel. Fish now 15 to 20 miles off coast.
- May 23.—Two-thirty p.m. on western edge Roseway bank. No mackerel sighted. Weather conditions unfavourable.
- May 24.—Ten a.m. off Little Hope. No mackerel sighted.
- May 25.—*Arras* position 6 p.m. south from Little Hope. No fish sighted, American mackerel seiners have arrived on our coast. Two American beam trawlers fitted with purse seine are with fleet.

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- May 26.—*Arras* position 10 a.m. 15 miles south cape Roseway. Plenty mackerel showing and going east. Lockeport netters Grace MacKay reports taken 400 large mackerel last night and Nellie Banks taken 1,000 large mackerel. These fish taken 15 miles south Roseway.
- May 28.—Eight-thirty a.m. 17 miles southeast from Lockeport located large body mackerel going slowly eastward. Weather fine for observation.
- May 28.—Position 4 p.m. south of Liverpool. No fish sighted this afternoon.
- May 29.—*Arras* 12 miles southeast Little Pope. Increasing northeast winds and misty weather. Unfit for scouting. No mackerel sighted Liverpool to-night.
- May 30.—*Arras* Liverpool coaling ship. Proceed scouting when completed.
- June 1.—The large body of mackerel that is working east along coast is now located five miles south cape LaHave. Fish are from three to ten miles off the coast. Small schools showing on radius of seven miles.
- June 1.—One p.m. five miles southwest Betty's island. No mackerel sighted since last report. American fleet bound to Prospect for shelter.
- June 2.—*Arras* at Halifax. Weather unfit for scouting. Will complete with stores before sailing.
- June 5.—*Arras* position 6 p.m. fifteen miles west from Sambro. No fish sighted to-day. Weather calm and hazy.
- June 6.—*Arras* position 6 p.m. six miles west from Bettys island. Weather conditions light east winds and light fog. No fish sighted.
- June 7.—*Arras* position six p.m. four miles southwest from Beaver island. Small bunches of mackerel showing and going east close along the coast. Ten American seiners in sight. Going east.
- June 6.—Eleven-thirty last night sighted three large schools mackerel five miles south Cross island and moving slowly eastward. The main body of fish are still on west coast being halted in their easterly course by east winds and cold currents which is setting west along coast. American seiners are scattered along coast from LaHave to Sambro.
- June 8.—*Arras* position 4 p.m. three miles southwest from White island. Small bunches of fish going east. Thirteen American seiners holding close to three mile limit and we are in close touch with them.
- June 9.—Anchored at Fort Dufferin with eleven American seiners. Proceeding soon as weather clears.
- June 11.—*Arras* position 8.30 a.m. four miles south Beaver island. No fish sighted. Weather unfit for scouting. All American seiners returning Beaver harbour.
- June 12.—Eleven forty-five a.m. sighted large school mackerel two miles off White islands 12.20 p.m. Sighted small schools mackerel three miles south southwest from White islands. Fish moving very fast east and keeping close to shore. American seiners very active close to three mile limit.
- June 12.—*Arras* position 6 p.m. five miles off Liscombe. No fish sighted since last report.
- June 13.—Two-thirty p.m. sighted two large schools mackerel two and a half miles south from Whitehead light. Fish showing up good and moving east close along coast. Large catches of mackerel in nets off Country harbour. This morning one boat reports 1,600 fish.
- June 13.—*Arras* position 7 p.m. five miles southeast from Whitehead. Large body of mackerel going east towards Cape Breton coast.
- June 14.—Ten a.m. five miles south Canso. Large body of mackerel moving towards Cape Breton coast. Proceeding east towards Cape Breton coast.
- June 17.—*Arras* position 8 p.m. three miles south from Whitehead. No fish sighted to-day. We are cruising towards Cape Breton coast.

- June 18.—*Arras* position 3 p.m. three miles south from Scattarie, Cape Breton.
No fish sighted to-day.
- June 19.—*Arras* position 4.30 p.m. four miles southeast from Ingonish. Several small schools mackerel sighted going north.
- June 20.—*Arras* at Magdalen island. Weather conditions unfit for scouting.
No mackerel sighted to-day.
- June 22.—*Arras* at Souris. Weather unfit for scouting. Proceeding to-morrow morning.
- June 23.—*Arras* at Pictou. Proceeding Monday to south coast, Cape Breton.
- June 25.—*Arras* proceeding Halifax. Arriving to-morrow morning weather permitting.
- June 26.—*Arras* arrived Halifax this morning.

APPENDIX 5

The following is a statement of the different kinds of licenses issued by the different Inspectors, during the 1923-24 Season:—

MAGDALEN ISLANDS, QUEBEC—Inspector S. T. GALLANT

Kind of Licenses—	Number of Licenses Issued
Lobster fisherman's licenses.....	772
Lobster packing licenses.....	24
Lobster packing extensions.....	25
Herring trap-net licenses.....	23
Herring seine licenses.....	24
Smelt bag-net licenses.....	4
Receipt books.....	35
	<hr/> 847

PRINCE EDWARD ISLAND—Inspector S. T. GALLANT

Lobster fisherman's licenses.....	2,399 (1 cancelled)
Lobster packing licenses.....	197
Lobster packing extensions.....	103 (1 cancelled)
Cannery licenses.....	6
Quahaug fishery licenses.....	5
Oyster fishery licenses.....	164
Smelt gill-net licenses.....	307
Smelt bag-net licenses.....	270
Trap-net fishing licenses.....	3
	<hr/> 3,351 (1 cancelled)

MANITOBA—Inspector J. B. SKAPTASON

Commercial sturgeon fishery licenses.....	183
Domestic sturgeon fishery licenses.....	4
Angling permits for non-residents.....	37
Special fishery licenses.....	2,364 (3 cancelled)
Settler's permits.....	817
Receipt books.....	2,497 (3 cancelled)
	<hr/> 3,405 (3 cancelled)

SASKATCHEWAN—Inspector G. C. McDONALD

Commercial sturgeon fishery licenses.....	5
Domestic sturgeon fishery licenses.....	9
Commercial and fisherman's licenses.....	582
Domestic fishery licenses.....	80 (1 cancelled)
Indian and Half-breed permits.....	697
Receipt books.....	277
	<hr/> 1,373 (1 cancelled)

ALBERTA—Inspector R. T. RODD

Special angling permits.....	3,281 (2 cancelled)
Commercial and fisherman's fishery licenses.....	647
Domestic fishery licenses.....	131 (18 cancelled)
Indian and Half-breed permits.....	340
Receipt books.....	301
	<hr/> 4,399 (20 cancelled)

15 GEORGE V, A. 1923

NOVA SCOTIA—DISTRICT No. 1—Inspector A. G. McLEOD

Kind of licenses— <i>Continued</i>	Number of licenses issued
Lobster fisherman's licenses.....	2,190
Lobster packing licenses.....	55
Lobster packing extensions.....	38
Angling permits.....	28
Fish cannery.....	1
Salmon trap-net, pound-net or weir.....	157
Certificates under Sec. 63.....	50
Special fishery licenses for trap-net fishing.....	38
Salmon gill-net or drift-net licenses.....	28
^a Herring weir licenses.....	5
Smelt bag-net licenses.....	40
Smelt gill-net licenses.....	222
Oyster fishery licenses.....	91
Receipt books.....	6
	<hr/> 2,855

NOVA SCOTIA—DISTRICT No. 2—Inspector D. H. SUTHERLAND

Lobster fisherman's licenses.....	3,072 (2 cancelled)
Lobster packing licenses.....	81 (2 cancelled)
Lobster packing extensions.....	52 (1 cancelled)
Angling permits.....	28
Fish cannery.....	5
Salmon trap-net, pound-net or weir.....	120
Certificates under Sec. 63.....	102
Special fishery licenses for trap-net fishing.....	139
Salmon gill-net or drift, net licenses.....	177
Herring weir licenses.....	12
Smelt bag-net licenses.....	212
Smelt gill-net licenses.....	266
Oyster fishery licenses.....	89 (1 cancelled)
Receipt books.....	160 (2 cancelled)
Shad gill-net or drift-net licenses.....	6
Drag-seine licenses.....	181
	<hr/> 4,388 (5 cancelled)

NOVA SCOTIA—DISTRICT No. 3—Inspector H. H. MARSHALL

Lobster fisherman's licenses.....	3,595
Lobster packing licenses.....	32
Lobster packing extensions.....	21
Angling permits.....	364 (3 cancelled)
Fish cannery.....	7
Salmon trap-net, pound-net or weir.....	53
Certificates under Sec. 63.....	160 (1 destroyed)
Special fishery licenses for trap-net fishing.....	189 (1 cancelled)
Salmon gill-net or drift-net licenses.....	229
Herring weir licenses.....	70 (1 cancelled)
Smelt bag-net licenses.....	22
Smelt gill-net licenses.....	70
Receipt books.....	34
Salmon net permits.....	13
Scallop fishery.....	224 (3 cancelled)
Lobster pound licenses.....	5
Lobster pound certificates.....	107
Lease of Long Beach pond.....	1
	<hr/> 4,873 (8 cancelled)

NEW BRUNSWICK—DISTRICT No. 1—Inspector J. F. CALDER

Lobster fisherman's licenses.....	653
Fish cannery licenses.....	6
Shad gill-net or drift-net licenses.....	46
Special permit to dig soft-shell or long-neck clams.....	120
Herring weir licenses.....	552
Salmon gill-net or drift-net.....	77
Certificates under Sec. 63.....	5
Lobster pound licenses.....	5
Lobster pound certificates.....	239
Scallop fishery licenses.....	23
Lease of Dark Harbour fishing privileges.....	1
	<hr/> 1,482

^a Gaspereau and alewife weirs were issued on herring weir licenses.

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NEW BRUNSWICK—DISTRICT No. 2—Inspector R. CROCKER

Kind of Licenses— <i>Concluded</i>	Number of licenses issued
Lobster fisherman's licenses.....	2,400
Fish cannery licenses.....	1
Shad gill-net or drift-net.....	29
Salmon gill-net or drift-net.....	51
Certificates under Sec. 63.....	154
Lobster pound licenses.....	5 (1 cancelled)
Lobster pound certificates.....	267 (1 cancelled)
Lobster packing licenses.....	183
Lobster packing extensions.....	62
Quahaug fishery licenses.....	149
Gaspereau pound-net or trap-net.....	50
Salmon trap-net, pound-net or weir.....	375
Salmon net permits.....	43
Smelt bag-net licenses.....	4,423
Smelt gill-net licenses.....	162
Bass fishery licenses.....	98
Oyster fishery licenses.....	647
	<hr/> 8,616 (1 cancelled)

NEW BRUNSWICK—DISTRICT No. 3—Inspector H. E. HARRISON

Shad gill-net or drift-net licenses.....	219
Salmon gill-net or drift-net.....	105
Salmon net permits.....	129
Bass fishery licenses.....	20
Sturgeon fishery licenses.....	11
Smelt gill-net licenses.....	1
	<hr/> 485

BRITISH COLUMBIA—Inspector J. A. MOTHERWELL

Fish cannery licenses.....	18 (2 cancelled)
Special ahgling permits.....	5
Salmon trap-net licenses.....	6
Salmon purse seine licenses.....	196 (2 cancelled)
Cod fishery licenses.....	378
Assistant operator of salmon purse or drag seine.....	881 (17 cancelled)
License to assistant in a boat used in operating a salmon gill-net or drift-net.....	1,011 (19 cancelled)
Indian permits.....	153
Salmon trolling licenses.....	1,446 (1 cancelled)
Salmon fishery licenses.....	3,755 (1 cancelled)
License to a captain of salmon seine boat.....	69 (11 cancelled)
Salmon drag-seine licenses.....	31
Grayfish fishery licenses.....	47
License to a person engaged in cold storage or fish packing to buy fresh salmon from fishermen.....	162
Salmon cannery licenses.....	64 (4 cancelled)
Reduction works licenses.....	4
Boat license to buy fresh salmon from fishermen.....	177 (1 cancelled)
License to a captain of a herring seine boat.....	30
Fishery licenses for gill-nets, drift-nets or drag-seine operated in conjunction with power boats.....	286 (1 cancelled)
Herring purse seine licenses.....	41 (1 cancelled)
Herring drag-seine licenses.....	3
Smelt or sardine fishery licenses.....	53 (1 cancelled)
Sturgeon fishery licenses.....	4
Herring or pilchard gill-net or drift-net licenses.....	32
Crab fishery licenses.....	124
Whale factory licenses.....	3
Metal tags.....	1,613
Special seal destruction permits.....	15
Salmon curing licenses.....	49
Herring curing licenses.....	30
	<hr/> 10,687 (61 cancelled)

YUKON TERRITORY

Special fishery licenses.....	23
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MODUS VIVENDI LICENSES

Atlantic coast.....	88 (1 cancelled)
Pacific coast.....	212 (1 cancelled)
Total number licenses issued.....	<hr/> 47,084 (102 cancelled)

APPENDIX NO. 6

LIST of United States Fishing vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1923

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Arthur James.....	95	19	1	Shelter.....	cwt.
Aviator.....	210	9	4	" for men.....	
Avalon.....	69	21	8	" bait, ice.....	
Angeline C. Nunan.....	58	21	1	"	
Aeolus.....	16	9	17	"	6 sword-
American.....	63	23	10	" bait, ice.....	fish.
Acushla.....	70	23	7	" repairs.....	
Bay State.....	81	27	15	Repairs, supplies, shelter, bait, ice, dories, crew, trawl, gear.	
Benjamin M. Wallace....	49	19	2	To ship men, shelter.....	
Bethume.....	66	17	1	Shelter.....	
Constellation.....	89	19	2	"	
Catherine.....	77	27	8	Ice, bait, shelter.....	
Columbia.....	96	28	3	Dories, crew, shelter.....	
Corinthian.....	97	23	4	Dories, repairs, shelter.....	
Catharine Burke.....	68	19	6	Shelter, water.....	
Commonwealth.....	93	25	4	Dories, discharge one man, repairs, supplies.	
Coat.....	169	21	3	Repairs.....	
Camben.....	97	24	1	Shelter.....	
Cool.....	169	14	1	Shipping men.....	
Dawn.....	79	25	7	Shelter, engine repairs, oil.....	
Elizabeth W. Nunan....	48	17	2	Shelter.....	
Elizabeth Howard.....	90	22	9	" bait, supplies, sick man, ice..	25
Evelyn & Ruth.....	38	7	2	Shipping fish.....	99
Elizabeth & Ruth.....	38	20	2	Shelter.....	
Ellen T. Marshall.....	75	23	12	" salt, dories, bait.....	
Ethel B. Penny.....	59	19	4	" ship's log.....	
Elk.....	66	19	11	" bait, ice.....	
Edith C. Rose.....	70	23	5	Bait, repairs, shelter, sick man....	
Elmer E. Gray.....	71	19	5	Shelter, oil, bait, supplies.....	
Elsie G. Silva.....	50	19	1	"	
Flora L. Oliver.....	59	27	12	Shelter, exporting fish, bait, license, supplies, dories, ice.	60
F. L. Chelwina.....	56	19	1	Supplies.....	
Frances S. Grueby.....	94	25	3	Shelter, food.....	
Governor Marshall.....	60	23	9	Ice, supplies, bait, shelter.....	
Grand Marshall.....	70	25	13	Bait, ice, dories, sick man, shelter..	
Gertrude de Costa.....	61	19	5	Water, provisions, shelter.....	
Governor Foss.....	88	24	4	Crews, water, shelter.....	
Good Luck.....	55	19	12	Shelter, supplies, water.....	
Harmony.....	66	23	13	Shelter, bait, oil, men, ice.....	
Henry Ford.....	90	25	13	Ice, supplies, shelter, bait, men, food	6
Hazel R. Hines.....	79	21	2	"	
Hortense.....	43	19	1	Shelter.....	
Helena.....	40	13	1	Repairs.....	
Helja Silva.....	77	21	4	Shelter.....	
Hesperus.....	79	25	7	Repairs, sick man, shelter, dories, water, ice supplies.	44
Herbert Parker.....	78	23	9	Dories, supplies, bait, oil, shelter....	
Henrietta.....	62	19	2	Shelter.....	
Harvard.....	72	19	4	Gas, shelter, supplies.....	
Hope Leslie.....	19	11	1	Shelter.....	
Imperator.....	79	23	6	Shelter, bait, ice land fish.....	13
Joffre.....	80	25	3	Ice, supplies, land fish, bait.....	50
John J. Fallon.....	60	19	5	Ice, bait, shelter.....	
Judique.....	89	6	1	Shelter.....	
Killarney.....	73	22	10	Shipping men, shelter, repairs.....	
Lucia.....	43	17	7	Shelter.....	
Loon.....	169	21	5	Bunker coal, repairs to engine, shipping men.	
L. A. Dunton.....	94	23	4	Sent sick man home, shelter, water, provisions.	

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LIST of United States Fishing vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1923—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Lark.....	121	23	2	Shelter.....	cwt.
Laura Goulart.....	73	21	1	".....	
Mary T. Fallon.....	48	19	4	Ice, shelter, repairs.....	
Mayflower.....	113	25	18	Bait, ice, supplies, shelter, bait reports, salt.	
Mary F. Curtis.....	65	21	25	Ice, trawl gear, bait, storing bait, men, shelter, salt, water, oil.	
Morning Star.....	85	19	10	Shelter, repairs, ice.....	
Mary E. O'Hara.....	49	22	10	".....	
Mildred Robertson.....	73	19	5	Master burned by explosion, bait, land fish, landed sick man, shipped one.	41
Medric.....	189	21	2	Repairs.....	
Nirvana.....	50	12	4	Shelter, shipped a man.....	
New Dawn.....	20	9	4	".....	
Natalie Hammond.....	51	21	4	".....	
Orion.....	39	13	2	Shelter.....	
Oretha F. Spinney.....	87	25	4	Ice, bait, supplies, dories, landed fish, man, transhipped catch.	111
Osprey.....	169	23	4	Bunker coal, repairs.....	
Pioneer.....	53	17	3	Water, shelter.....	
Pilgrim.....	63	18	2	Ice, bait, landed man.....	
Progress.....	78	19	1	Shelter.....	
Phillip P. Mantha.....	43	17	2	".....	
Plover.....	208	21	4	To land sick men.....	
Progress.....	61	23	6	Repairs, shelter, dory, supplies.....	
Pollyana.....	66	19	3	Bait, shelter.....	
Rex.....	75	23	8	Ice, shelter, repairs, supplies, bait...	
Ruth & Margaret.....	77	23	4	Ice, bait, sick man.....	
Ralph Brown.....	67	20	3	Shelter.....	
Republic.....	48	19	13	Ice, supplies, shelter, landing halibut, bait, dories.	82
Ruth.....	49	20	6	Shelter, supplies.....	
Ripple.....	96	20	1	To land sick men.....	
Sunapee.....	18	9	8	Supplies, shelter.....	
Surf.....	119	16	14	".....	
Swell.....	119	24	6	Shelter.....	
Stilletto.....	91	19	4	".....	
Shianne.....	21	5	1	".....	
Saturn.....	137	22	1	In for 2 men.....	
Snipe.....	208	19	1	Supplies, crew.....	
Shamrock.....	68	27	1	Shelter.....	
S. A. Denton.....	94	23	1	Bait.....	
T. M. Nicholson.....	90	17	9	Ice, bait, shelter, salt, men.....	
Thomas S. Gorton.....	92	23	8	Bait, ice, discharging men, shelter..	
Thelma.....	28	12	2	Shelter.....	
Teazer.....	59	22	2	" bait.....	
Tern.....	208	21	3	Land sick men, ship men.....	
Waltham.....	44	20	2	Shelter.....	
Yankee.....	96	25	3	".....	

LIST of United States Fishing vessels which entered Canadian Ports on the
Pacific Coast during the year ended December 31, 1923

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
Arctic.....	29	6	1	Land fish.....	1,020
Adeline.....	6	2	1	".....	280
Anna J.....	22	5	2	" bait and ice.....	2,360
Alaska.....	44	15	1	".....	4,100
Augusta.....	19	4	1	".....	780
Arcade.....	14	5	13	" bait, ice.....	80
Atlas.....	31	7	1	".....	1,040
Atlantic.....	25	11	2	".....	2,280
Albatros.....	40	13	6	" bait, ice.....	1,200
Alter.....	43	15	1	".....	7,560
Arctic.....	37	6	1	".....	320
Aberdeen.....	29	5	1	Shelter.....	
Alki.....	4	2	1	Land fish.....	20
Arctic.....	4	3	1	Broken machinery.....	
Alfa.....	4	3	1	".....	
America.....	25	11	10	Land fish, bait, ice.....	800
A. 125.....	2	1	1	Ice and bait.....	
Actor.....	7	1	2	".....	
Antler.....	22	5	5	" land fish.....	660
Aurora.....	16	5	16	Supplies, bait and ice.....	
Alice.....	21	3	1	Bait.....	
Alfa.....	12	5	7	" ice.....	
Agnes.....	17	5	6	Bait and ice.....	
Alice B.....	13	5	11	" land fish.....	220
Active.....	4	2	1	".....	
Alf.....	4	1	2	".....	
Baltic.....	20	4	1	Land fish.....	740
Brothers.....	13	5	1	".....	1,260
Bravo.....	10	3	1	".....	1,040
Bringold.....	12	5	1	".....	880
Bolinder.....	5	1	2	Supplies, bait.....	
Beaver.....	17	5	13	Bait and ice.....	
Bonnie Lass.....	2	2	1	Supplies.....	
Commonwealth.....	60	17	2	Land fish, ice and bait.....	2,100
Constitution.....	57	9	1	".....	3,080
Carolan.....	18	3	1	".....	600
Corona.....	19	11	8	" bait and ice.....	680
Confidence.....	22	3	1	Supplies.....	
California.....	20	5	5	Land fish, bait, ice.....	720
Chimera.....	9	3	7	".....	380
Chancellor.....	13	5	6	".....	840
Crescent.....	8	4	2	" ice and bait.....	1,200
Cape Clear.....	13	4	8	".....	360
Corsair.....	4	3	1	Shelter.....	
Cora.....	4	3	1	Land fish.....	220
Circle H.....	4	1	1	Supplies.....	
Cora.....	9	5	1	".....	
Carlisle.....	10	2	1	Land fish.....	200
Cedric.....	19	4	1	".....	200
Chatham.....	24	5	1	Ice and bait.....	
Christina.....	4	1	5	Supplies, land fish, unknown.....	24
Ceta H.280 H.....	4	1	1	Supplies.....	
125 C. A.....	2	1	1	".....	
Clarion.....	15	4	1	Bait and ice.....	
Dora H.....	15	5	5	".....	
Defence.....	20	5	1	Land fish.....	1,680
Don Carlos.....	8	3	1	".....	120
Discovery.....	10	4	1	".....	520
Daily.....	26	6	1	".....	2,220
Democrat.....	27	6	1	".....	1,700
Director.....	14	5	2	".....	260
Doll.....	4	1	1	Supplies.....	
Dependent.....	4	3	1	Land fish.....	80
Dreamer.....	25	2	1	Shelter.....	
Evolution.....	17	5	10	Land fish, ice and bait, engine trouble.....	240
Eidsvold.....	15	5	11	Land fish, bait, for orders, fresh water.....	1,000

SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Continued*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Eastern Point.....	4	3	1	Land fish.....	cwt. 600
E. Neilson.....	15	4	6	" ice and bait.....	500
Eagle.....	9	3	2	"	780
Eureka.....	4	2	1	"	40
Emla.....	4	2	1	"	40
Emblem.....	4	2	1	"	100
Eagle.....	67	17	1	"	1,660
Emma.....	17	2	1	Ice and bait.....	
Enterprize.....	8	3	10	Bait and ice.....	
Erin.....	28	4	1	"	
Eleanora.....	16	5	6	"	
Famous.....	9	3	1	Engine trouble.....	
Forward.....	18	5	4	Land fish, ice and bait.....	1,860
Fairway.....	19	5	5	"	1,480
Fremont.....	10	4	8	"	260
Fortuna.....	21	5	12	" for orders.....	60
Flower.....	3	2	1	"	20
Faith.....	7	3	10	" bait and ice.....	60
Fram.....	4	3	1	"	100
Flattery.....	10	3	1	"	60
Ford.....	4	3	1	"	140
Flora.....	4	3	2	" bait and ice.....	140
Flamingo.....	13	5	6	Bait and ice.....	
F. C. Hergert.....	15	5	8	"	
Gladstone.....	23	6	1	Land fish.....	1,960
Gony.....	12	5	3	" bait and ice, stores.....	280
Get the Hook.....	10	1	1	"	20
Glacier.....	12	4	1	"	760
Grayling.....	16	5	1	"	620
Groth.....	7	3	1	"	360
Grechen.....	7	3	2	"	240
Good-Will.....	4	4	1	Supplies.....	
Gold Fish.....	4	2	1	Land fish.....	20
Genevieve.....	4	2	1	"	40
G. A. 883.....	3	1	2	Ice and bait, supplies.....	
Grant.....	5	2	1	Land fish.....	160
G. A. 473.....	4	2	1	Supplies.....	
Helgeland.....	56	15	1	Land fish.....	7,380
Harding.....	19	5	5	" ice and bait.....	1,060
Happy.....	12	4	2	"	760
Hilda.....	10	3	2	"	11,960
Hazel.....	7	3	2	"	360
Hazel H.....	24	5	7	" bait and ice.....	1,440
Hazel L.....	9	3	2	Shelter, ice and bait.....	
Hi Gill.....	11	4	3	Land fish, bait, engine trouble.....	1,120
Hilda.....	16	3	1	"	100
Hanna.....	11	8	4	Shelter, ice and bait.....	
Harvestor.....	15	5	2	Land fish, bait and ice.....	100
Hiawatha.....	3	3	1	Shelter.....	
Hurget.....	15	5	1	Ice and bait.....	
Imperial.....	35	5	1	Land fish.....	1,240
Ictus.....	3	3	1	Shelter.....	
Inverness.....	16	2	1	"	
Jennie F. Decker.....	16	8	15	Bait and ice.....	
Judith.....	5	3	8	" land fish.....	8
June.....	15	5	1	Land fish.....	900
J. P. Todd I.....	4	2	1	"	140
J. P. Todd II.....	12	5	1	"	200
Jennie.....	10	5	1	"	40
Jeanette.....	6	1	1	"	40
Kennebec.....	3	3	1	"	100
Kodiak.....	38	13	6	Engine trouble, land fish, ice and bait.....	2,280
Kanatak.....	38	7	1	Land fish.....	840
K. 377.....	4	2	1	"	60
Katella.....	16	6	17	Stores, bait.....	
LaPaloma.....	14	11	9	Land fish, ice and bait.....	160
Lenor.....	14	4	1	"	480
Lancing.....	20	4	1	"	820

LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Continued*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Lebanon.....	14	5	10	" ice and bait, water and towing Tillicum.	cwt. 100
Lunmen.....	10	4	1	"	880
Lincoln.....	23	6	5	" ice and bait.....	2,060
Lituya.....	30	11	2	"	1,480
Lincoln.....	4	2	1	"	280
Liberty.....	17	7	1	"	640
Lief II.....	21	3	1	"	360
Liberty.....	4	1	1	Ice and bait.....	
Lite H. 280.....	4	1	1	"	
Louis.....	4	2	1	Land fish.....	60
Lervis II.....	8	3	1	Ice and bait.....	
Leona.....	3	1	1	Supplies.....	
775 L.....	3	3	1	"	
681 L.....	2	4	1	"	
972 L.....	5	1	1	"	
Laurel M.....	5	3	1	Water.....	
Lincoln.....	9	5	1	"	
Louise.....	16	6	17	Bait and ice.....	
Laura.....	7	3	5	"	
Liberty.....	44	16	4	"	
Mermaid.....	19	5	7	Land fish, bait and ice.....	460
Mildred 13.....	19	5	12	" bait.....	380
Mars.....	9	4	2	" water.....	420
Mira.....	7	3	1	"	640
Mildred II.....	31	6	3	" bait and ice.....	1,520
Marie M.....	5	2	3	"	102
Magnolia.....	25	4	1	"	240
Madeline J.....	21	5	10	" ice and bait.....	140
Majestic.....	33	7	1	"	2,800
Mary G.....	4	2	3	Supplies, ice and bait, water.....	
Muzon.....	19	4	1	Ice and bait.....	
M. & K.....	4	2	3	Land fish, bait and ice.....	10
Mary.....	16	8	11	Bait, ice.....	
Myrtle.....	9	4	15	"	
Myron.....	2	2	1	Supplies.....	
M. 935.....	5	5	1	"	
M. 147.....	4	5	1	"	
Mary.....	11	8	1	Bait and ice.....	
Myrtle.....	19	3	1	"	
Nomad.....	15	5	10	Land fish, for orders, engine trouble, bait, ice.	450
National.....	20	6	8	Land fish, ice and bait.....	1,480
Norland.....	19	6	1	"	420
North.....	9	5	9	" bait and ice.....	200
Norma.....	9	3	1	"	880
Norma.....	6	3	1	"	60
Neptune.....	6	3	1	"	140
Nesmar.....	2	2	1	"	20
NeLu.....	4	2	1	"	40
North Light.....	13	3	2	Shelter, water.....	
New England.....	70	28	1	Land fish.....	1,540
Nelson.....	15	4	1	Ice and bait.....	
Ouah.....	18	5	6	Land fish, ice and bait.....	640
Omancy.....	34	12	3	" for orders, bait and ice...	3,400
Orient.....	48	15	4	" bait and ice.....	301
Pelican.....	17	4	4	" ice and bait.....	900
Pioneer.....	48	15	1	"	5,680
Presho.....	14	5	4	" bait and ice.....	440
Pioneer III.....	26	5	9	"	1,500
President.....	24	6	6	"	1,240
Panama.....	34	13	3	" ice and bait.....	3,800
Pirate.....	20	3	1	"	200
Polaris.....	45	15	2	" bait and ice.....	2,560
Petrel.....	67	7	1	Land sick man.....	
Pearl F.....	7	2	1	Ice and bait.....	
Primrose.....	4	1	3	Land fish, bait and ice.....	15
Pershing.....	18	5	12	Bait, ice.....	

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List of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Continued*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
Prosperity.....	25	6	4	"	
Republic.....	51	14	1	Land fish.....	8,040
Reliance.....	11	5	5	" for orders.....	1,240
Reliance No. 1.....	19	5	2	" ice and bait.....	1,980
Reliance.....	14	4	1	"	420
Reliance.....	8	3	1	"	880
Rolfe.....	10	5	1	"	1,380
Restitution.....	24	5	9	" ice and bait, supplies.....	1,100
Roald Amunsden.....	16	6	1	"	1,800
Rosario.....	16	5	8	" bait and ice.....	180
Rambler.....	10	3	2	" supplies.....	60
Rival.....	4	3	1	"	80
Raven.....	4	2	1	"	300
Reform.....	4	3	1	"	240
Royal.....	15	5	6	" ice and bait.....	540
Ramier.....	4	3	1	"	360
Radio.....	63	16	1	"	3,620
Ruth M.....	5	1	2	Supplies.....	
Rolfe.....	4	1	1	Land fish.....	8
Roosevelt.....	13	5	11	Bait.....	
Sunset.....	37	8	1	Land fish.....	340
Seymour.....	44	16	2	" bait and ice.....	1,020
Sunland.....	26	4	1	Land fish.....	400
Success.....	4	3	1	"	520
Sirius.....	17	4	1	"	360
Senator.....	11	6	1	"	2,320
Sitka.....	50	15	1	"	3,260
Summer.....	34	13	1	"	3,280
Secla.....	18	2	1	Shelter.....	
Seattle.....	55	15	3	Land fish, ice and bait.....	2,800
Scandia.....	76	17	1	"	5,080
Sadie K.....	13	5	6	" ice and bait, engine trouble	880
Sherman.....	18	5	1	"	2,060
Samson.....	7	3	1	"	180
Star.....	12	4	1	"	920
Scout.....	4	2	1	"	260
Star.....	7	4	3	" ice and bait.....	180
Sentinel.....	21	6	1	"	1,360
Snowir.....	8	2	1	"	80
S. & S.....	4	3	1	"	180
Sea Lion.....	6	2	5	" unknown, bait and ice.....	25
Sammy.....	8	3	15	Bait and ice.....	
S.F. 680 L.....	3	2	1	Supplies.....	
Solo.....	2	2	1	"	
Spencer.....	17	5	6	Bait, engine trouble.....	
Superior.....	16	5	12	Bait and ice.....	
Swift.....	7	2	3	"	
Siloam.....	16	5	2	"	
Tom Boy.....	5	4	1	Shelter.....	
Tyce.....	12	4	1	Land fish.....	1,120
Tom & Al.....	57	15	1	"	5,360
Tahoma.....	18	6	2	" ice and bait.....	2,560
Tordenskjold.....	57	13	1	"	4,140
Texas.....	16	5	4	" bait and ice.....	200
Thelma.....	32	5	5	" ice and bait.....	460
Tatoosh.....	21	6	1	"	1,960
Tillikum.....	21	5	13	" unknown, engine trouble,	740
				Water.....	
Trío.....	19	5	3	Land fish, ice and bait.....	260
Teddy, J.....	13	4	1	"	1,320
T. 965.....	4	1	1	"	40
Tarembo.....	12	2	4	" bait.....	120
Uranus.....	15	6	3	" ice and bait.....	1,440
Unimak.....	10	3	1	"	520
Ure.....	5	1	1	Water.....	
Vivian.....	9	3	1	Land fish.....	580
Vansee.....	43	10	1	"	6,100
Valorous.....	21	4	1	"	1,720

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LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Virginian.....	33	5	1	"	cwt. 1,940
Volid.....	8	3	11	" bait and ice.....	120
Venus.....	4	3	1	"	1,320
Viking.....	11	4	1	"	720
Vesta.....	13	5	1	"	900
Venus.....	25	7	1	"	2,260
Volunteer.....	21	5	10	" bait, for orders, ice.....	160
Viscara.....	33	5	1	Repairs.....	
Velva.....	6	2	1	Bait, ice.....	
Velero.....	6	3	11	Bait and ice.....	
Volunteer.....	19	5	8	"	
Virginis.....	5	2	2	" land fish.....	6
Westfjord.....	17	5	6	Land fish, bait, ice.....	360
Woodrow.....	23	5	6	" ice and bait.....	450
Wabash.....	6	3	1	"	1,020
Wilson.....	19	5	5	" ice and bait.....	100
Wireless.....	19	6	5	"	900
Wave.....	7	3	1	"	580
Washington.....	13	4	1	"	760
White Star.....	17	4	2	"	420
Wyague.....	4	3	1	Ice and bait.....	
Wilhelmina.....	17	5	14	Supplies, bait and ice.....	
Xaporta.....	187	36	1	Land fish.....	400
Yakutat.....	41	13	6	" bait and ice.....	2,380
Yellowstone.....	22	5	1	"	1,180

Zoo!

Zool.

